

Villar under T. hamiltoniana are actually T. philippinensis. He cites, in addition, Cuming 1432 (type), Medina s.n. [Philip. Forest. Bur. 25065], Curran & Merritt s.n. [Philip. Forest. Bur. 7746].

The species is said to grow in rather open brushland, thickets and secondary forests at low altitudes.

Citations: PHILIPPINE ISLANDS: Luzon: E. D. Merrill Sp. Blanc. 503 (Bz--23734, Bz--23735, N).

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MATERIALS TOWARD A MONOGRAPH OF THE GENUS VITEX. I

Harold N. Moldenke

VITEX Tourn. ex L., Sp. Pl., ed. 1, 635. 1753; Gen. Pl., ed. 5, 285. 1754.

Literature: Bock, De Stirp. 1075. 1552; Tourn., Instit. Rei Herb. 603. 1719; L., Syst., ed. 1. 1735; Blackwell, Herb. Blackw. pl. 139. 1757; L., Sp. Pl., ed. 1, 2: 635 & 638. 1753; L., Gen. Pl., ed. 5, 285. 1754; Adans., Fam. Pl. 2: 12 & 200. 1763; L., Gen. Pl., ed. 6. 1764; Weston, Botan. Univers. 1: 311. 1770; Vand., Fl. Lusit. 42--43, pl. 3, fig. 21. 1788; Gaertn., De Fruct. & Sem. 1: pl. 56. 1788; A. L. Juss., Gen. Pl. 107 & 119--123. 1789; Neck., Elem. Bot. 1: 328--358. 1790; Cothen, Disp. Veg. 8. 1790; Lour., Fl. Cochinch. 84. 1790; Vahl, Eclog. Amer. 2: pl. 18. 1791; Schkuhr, Bot. Handb. 1791--1803; Nernich, Allgem. Polyglott. Lex. Naturgass. 1793--1795; Vent., Tabl. Reg. Veg. 2: 219. 1794; Roem., Script. Hisp. 126, pl. 7, fig. 21. 1796; Bot. Mag. 11: pl. 364. 1797; Lam., Tabl. Encycl. 3: pl. 541. 1797; A. Rich. in Marthe, Cat. Pl. Jard. Méd. Paris 67. 1801; Mirbel, Hist. Nat. Pl., ed. 3, 15: 206. 1805; Thou., Gen. Nov. Madag. 8. 1806; Pers., Syn. Pl. 2: 173. 1806; A. L. Juss., Ann. Mus. Hist. Nat. Paris 7: 70 & 77. 1806; Lam. & DC., Fl. Franç. 3: 502. 1815; G. F. W. Mey., Prim. Fl. Esseq. 219. 1818; Bot. Mag. 47: pl. 2187. 1820; Roth, Nov. Pl. Sp. 317. 1821; Reichenb. in Mössler, Handb. Gewächsk., ed. 1, 1: xxxvi. 1827; Schumacher, Beskriv. Guin. Pl. 1827; Duby in P. DC., Bot. Gall. 1: 375. 1828; Reichenb., Conspect. Reg. Veg. 1: 117. 1828; Sibth. & Sm., Fl. Graec. 7: pl. 609. 1830; Wall., Pl. As. Rar. pl. 226. 1832; Reichenb. in Mössler, Handb. Gewächsk., ed. 3, 1: lxxv. 1833; Manso, Enum. Subst. Braz. 36. 1836; Endl., Gen. Pl. 635. 1836--1840; A. Cunn., Ann. Nat. Hist., ser. 1, 1: 461. 1838; A. DC., Bibl. Univ. Genève. 17: 132. 1838; Hook. & Arn., Bot. Beech. Voy. pl. 47 & 48. 1841; Hook., Icon. Pl. 5: pl. [419] 420. 1842; Wight, Icon. 2: pl. 519. 1843; Walp., Repert. 4: 91. 1844; Benth. Bot. Voy. Sulphur 10. 1844; Bertol., Fl. Ital. 6: 455--457. 1844; Gussone, Fl. Sic. Syn. 2: 1 & 110. 1844; Schau. in A. DC., Prodr. 11: 218 & 682--683. 1847; Walp., Annal. 1: 545. 1848--1849; Hook., Niger Fl. 487. 1849; Wight, Icon. 4 (1): 1465--1467. 1849;

A. Rich in Sagra, Hist. Fis. Cuba 2 (2): pl. 64. 1850; Schau. in Mart., Fl. Bras. 9: 164 & 294--295. 1851; Walp., Annal. 3: 240. 1852; Seem., Bot. Herald 329 & 355, pl. 71. 1856; Benth., Journ. Linn. Soc. Lond. 1: 53. 1857; Reichenb., Icon. Fl. Germ. 18: pl. 1293. 1857; Seem., Bot. Herald 370 & 405. 1857; Tornabene, Fl. Foss. Etna 122--126, pl. 3, fig. A'. 1859; Tornabene, Atti Accad. Gioenia Sci. Nat., ser. 2, 16: 118 & 122, pl. 3, fig. A. 1860; Walp., Annal. 5: 712. 1860; Bocq., Rév. Groupe Verbénac. 21--22 & 154, pl. 4. 1861--1863; Seem., Trans. Linn. Soc. Lond. 23: 9. 1862; Turcz., Bull. Soc. Imp. Nat. Mosc. 36 (2): 223--224. 1863; Seem., Fl. Vit. 189, pl. 45. 1866; Kotschy & Peyr., Pl. Tinn. pl. 12. 1867; Hereman in Paxt., Bot. Dict., new ed. 1868; Ettingsh., Denkschr. Akad. Wien 28: 219, pl. 37, fig. 4. 1868; Benth., Fl. Austral. 5: 58 & 66. 1870; Carr., Rev. Hort. 42: 415. 1871; Van Hall, Kruidt. Rijks Hoog. Burgersch. 1871; Moggr., Contrib. Fl. Ment. pl. 14. 1871; Bedd., Fl. Sylv. pl. 252. 1872; Oliv., Trans. Linn. Soc. Lond. 29: 132, pl. 130--131. 1875; Eichler, Blütendiag. 1: 229. 1875; Ulrich, Internat. Wörterb. Pflanzen Namen. 1875; Engelhardt, Nov. Act. Leop.-Carol. Akad. 38: 362, pl. 18, fig. 15. 1876; Benth. in Benth. & Hook. f., Gen. Pl. 2 (2): 1154. 1876; J. G. Baker, Fl. Maurit. 255. 1877; Pickering, Chronolog. Hist. Pl. 1879; Vatke, Linnaea 43: 507. 1882; Engl., Versuch. Entwickl. Pflanzenw. 2: 278--288. 1882; Pritzel & Jessen, Deutsch. Volksn. Pfl. 1882; J. G. Baker, Journ. Linn. Soc. Lond. 20: 159. 1883; W. Mill., Dict. Eng. Names Pl. 1884; Solereder, Über Systemat. Wert Holzstruct. Dikot. 203. 1885; Vesque, Ann. Sci. Nat., sér. 7, 1: 183 & 335. 1885; Leunis-Frank, Synopsis Pflanzenkunde. 1885; C. B. Clarke in Hook. f., Fl. Brit. Ind. 4: 583. 1885; J. G. Baker, Journ. Linn. Soc. Lond. 21: 407. 1886; Baill., Dict. Bot. 2: 677. 1886; Baill., Bull. Soc. Linn. Paris 1: 686. 1887; Cent. Internat. Exhib. Melbourne Cat. Woods. 1888; J. G. Baker, Journ. Linn. Soc. Lond. 25: 294. 1890; Baill., Hist. Pl. 11: 116. 1892; Baill., Dict. Bot. 4: 68 & 263. 1892; Bergen, Pop. Amer. Plant Names. 1893; Scott-Elliot, Journ. Linn. Soc. Lond. 29: 1. 1893; Watt, Dict. Econom. Prod. India 6 (4): 200. 1893; Gürke in Engl., Bot. Jahrb. 18: 165. 1893; Hook., Icon. Pl., ser. 3, vol. 4. 1894; Engl., Pflanzenw. Ost-Afr., part C. 1895; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 132, 170, & 178. 1895; Encycl. Nederl. Ind. 1895--1905; Diels in Engl., Bot. Jahrb. 2h: 568--647. 1898; DeWild. & Th. Dur., Mat. Fl. Congo. 1899; Solereder, Systemat. Anatomie Dikot. 711. 1899; DeWild. & Th. Dur., Annal. Mus. Congo Bot., ser. 2. 1899--1900; Gürke in Engl., Bot. Jahrb. 28: 291. 1900; Hiern, Cat. Afr. Pl. Welw. 4: 827. 1900; Baker & Stapf in Thistelt.-Dyer, Fl. Trop. Afr. 5: 273-320. 1900; H. H. W. Pearson in Thistelt.-Dyer, Fl. Cap. 5 (1): 180 & 211--212. 1901; M. Bailey, Queensl. Fl. 4: 1164--1185. 1901; DeWild. & Th. Dur., Annal. Mus. Congo Bot., ser. 3. 1901; Hook., Icon. Pl., vol. 8. 1901; DeWild., Annal. Mus. Congo Bot., ser. 4. 1902--1903; Gilg in Engl., Monog. Afr. Pflanzen-Fam., vol. 7. 1903; Malet, Etude Bot. & Chim. Vitex 37--38. 1903; Baum in Warburg, Kumene-Sambesi Exped. 1903; DeWild., Annal. Mus. Congo Bot., ser. 5, vol. 1. 1903--1906; Gürke in Engl., Bot. Jahrb. 33: 292.

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Synonymy: Mailelou Rheede ex Adans., Fam. Pl. 2: 12 & 200. 1763. Pistacio Vitex L. ex Adans., op. cit. 200, in syn. 1763. Limia Vand., Fl. Lusit. 42--43, pl. 3, fig. 21. 1788. Nephandra Willd. in Cothen., Disp. Veg. 8. 1790. Allasia Lour., Fl. Cochinch. 84. 1790. Tripinna Lour., op. cit. 476. 1790. Chrysomallum Thou., Gen. Nov. Madag. 8. 1806. Tripinnaria Pers., Syn. Pl. 2: 173. 1806. Pyrostoma G. F. W. Mey., Prim. Fl. Esseq. 219. 1818. Wallrothia Roth, Nov. Pl. Sp. 317. 1821. Vitex L. ex Reichenb., Conspect. Reg. Veg. 1: 117. 1828. Ephialis Banks & Soland. ex A. Cunn., Ann. Nat. Hist., ser. 1, 1: 461. 1838. Psilogyne A. DC., Bibl. Univ. Genève. 17: 132. 1838. Casarettoa Walp., Repert. 4: 91. 1844. Macrostegia Nees in A. DC., Prodr. 11: 218. 1847. Ephialis Banks & Soland. ex Seem., Fl. Vit. 189. 1866 [not Ephialis Schreb., 1791]. Agnus-castus Tourn. ex Carr., Rev. Hort. 42: 415. 1871. Varegevillaea Baill., Hist. Pl. 11: 116, in part [flowers only]. 1892. Cussarettoa Walp. ex Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 170, in syn. 1895. Varangevillea Baill. apud Durand, Ind. Kew. Suppl. 1: 449. 1906. Yitex Eig, Zohary, & Feinbrunn, Plants of Palestine 426, sphalm. 1931. Calymega Poit. ex Moldenke, Prelim. Alph. List Invalid Names 14, in syn. 1940. Virtex Tourn. ex Moldenke, Suppl. List Invalid Names 10, in syn. 1941. Viex Fisher ex Moldenke, Alph. List Inval-

id Names Suppl. 1: 28, in syn. 1947. Varengavillea Baill. ex Moldenke, op. cit. 22, in syn. 1947. Agnus castus Carr. ex Rehd., Bibl. Cult. Trees 584, in syn. 1949. Neoseemannia Boivin, in herb. Pseudobasleria Von Rohr, in herb. Rhamnotiphus Danguy, in herb.

Trees or shrubs, very rarely woody vines, varying from glabrous to tomentose or villous; leaves decussate-opposite or ternate, palmately compound, mostly 3--7-foliolate (rarely 1-foliolate), the elaflets chartaceous or membranous (sometimes coriaceous), mostly petiolulate, entire or dentate, rarely incised or lobed; inflorescence cymose, the cymes short and dense or loosely divaricate, sessile or pedunculate in the leaf-axils or aggregate in terminal racemiform or thyrsoid or laxly diffuse panicles or more rarely contracted into heads, occasionally few- or 1-flowered, rarely cauliflorous; flowers perfect, more or less zygomorphic; bractlets and prophylla usually very small, mostly linear, sometimes longer than the calyx; calyx campanulate, cyathiform, or rarely tubular-infundibular, 5-dentate or 5-fid, rarely 3-fid or 6-lobed, the teeth mostly slightly unequal; corolla white, blue, violet, or yellowish, long-tubular, cylindric, or hypocrateriform, zygomorphic, its tube short or rarely elongate, cylindric, straight or slightly incurved, equal in diameter throughout or slightly ampliate above, its limb oblique, spreading, more or less bilabiate, the upper lip often bifid, the lower lip trifid, the two posterior lobes exterior and usually shorter, the lateral lobes larger, the anterior lobe largest, entire or emarginate, the upper lip erect, arched, or resupinate; stamens 4, didynamous, inserted in the corolla-tube, often exserted, the anthers 2-celled, the thecae distinct, subparallel, divergent or arcuate, attached near their apex, dehiscing by longitudinal slits; pistil single, compound, bicarpellary; style terminal, filiform, shortly bifid at the apex, the branches acute; ovary at first imperfectly 2-celled, during anthesis usually 4-celled, the cells 1-ovulate; ovules attached laterally at or above the middle of the cell; fruiting-calyx often accrescent, usually patelliform or very shallowly cupuliform, rarely subincluding the fruit; fruit drupaceous, more or less fleshy, the endocarp hard, often horny, sometimes very much incrassate in relation to the cells, 4-celled; seeds obovate or oblong, erect, without endosperm.

A genus of about 330 species and subspecific entities, mostly of the tropics and subtropics of both the Eastern and Western Hemispheres; a few also found in the temperate portions of Europe and Asia; widely cultivated and naturalized elsewhere. A few fossil forms are known from Europe and the Cameroons. Type species: V. agnus-castus L.

The generic name is derived from the Latin word vico, meaning "to bind", as with osier twigs, in reference to the flexibility of the shoots of the type species. It starts as a generic name in Tournefort's *Instit. Rei Herb.* 603 (1719), and is used again, accredited to Tournefort, by Linnaeus in his *Syst.*, ed. 1 (1735). It was used even earlier, however, by Hieronymus Bock, who appli-

ed it in his *De Stirp.* 1075 (1552) to what we now call Vitex agnus-castus. Pliny, Dioscorides, and Homer applied the name "Agnos" or its Greek equivalent to this species.

Endlicher (1836--1840) divided the genus into two subgenera: (1) Agnus-castus (Tourn.) Endl. and (2) Limia (Vand.) Endl. The first he characterizes as having cymes terminal and paniculate, while the latter has the cymes axillary, often long-pedunculate, but sometimes contracted and subcapitate.

In 1847 Schauer divided the genus as follows:

Section 1. Euagnus Schau.

Subsection 1. Paniculatae Schau.

Subsection 2. Cymosae Schau.

Section 2. Pyrostoma (G. F. W. Mey.) Schau.

Section 3. Chrysomallum (Thou.) Schau.

In 1895 Briquet modified this classification as follows:

Section 1. Agnus-castus (Tourn.) Briq.

Subsection 1. Terminales Briq.

Subsection 2. Axillares Briq.

Subsection 3. Glomerulosae Briq.

Section 2. Pyrostoma (G. F. W. Mey.) Schau.

Section 3. Chrysomallum (Thou.) Schau.

Section 4. Glossocalyx (C. B. Clarke) Briq.

By far the most important work on the genus, however, was published in 1928 by Pieper in *Engl., Bot. Jahrb.* 62, Beibl. 141: 2--89. Although he actually monographs only the African members of the genus, he gives a thorough review of the genus as a whole. His classification is as follows:

Subgenus 1. Chrysomallum (Thou.) Pieper

Section 1. Simplicifoliae Pieper

Section 2. Digitatae Pieper

Subgenus 2. Euvitex Pieper

Section 3. Terminales (Briq.) Pieper

Subsection 1. Quinquelobatae Pieper

Subsection 2. Quadrilobatae Pieper

Section 4. Axillares (Briq.) Pieper

Subsection 3. Paniculatae Schau.

Subsection 4. Cymosae Schau.

Grex 1. Glandulosae Pieper

Group 1. Haplotriches Pieper.

Group 2. Eutriches Pieper

Subgroup 1. Rubiginosae Pieper

Subgroup 2. Griseae Pieper

Secondary subgroup 1. Parallelae Pieper

Secondary subgroup 2. Reticulatae Pieper

Grex 2. Pilosae Pieper

Group 3. Simplices Pieper

Group 4. Elongatae Pieper

Group 5. Clavatae Pieper

- Section 5. Glomerulosae (Briq.) Pieper  
 Subgenus 3. Holmskioldiopsis Pieper  
 Subgenus 4. Pyrostoma (G. F. W. Mey.) Pieper  
 Subgenus 5. Glossocalyx C. B. Clarke

Extensive notes on the wood anatomy of the genus are given by Record and Mell in their "Timbers of Tropical America", pp. 525--527 (1924). The gynoecium morphology is discussed in detail by Junell in Symb. Bot. Upsal. 4: 93 (1934). Hoehne in his Plant. Subst. Tox. Med. 249--250 (1939) gives a review of the economic and medicinal uses of the Brazilian species. Methods of propagation by hardwood cuttings are described by Putz in the "New York Herald Tribune" for October 13, 1946, page 13, with line-drawing illustrations. While these are intended to be applicable to species in common cultivation in the northeastern United States, they probably would serve as well for most species of the genus. Razi in Ecology 31: 284--285 (1950) describes the seed dissemination of members of this genus as endozoic, which is to be expected in view of their highly colored fleshy fruits.

The fungi Ophiobolus barbatus Pat. & Gaill. and Uredo viticis Juell. attack some members of the genus according to Seymour, Host Ind. Fungi N. Am. 588--589 (1929). According to Westcott's "Plant Disease Handbook", page 660 (1950), "leaf-spot" disease on members of this genus is caused by Cercospora viticis Ellis & Ev. and "root-rot" by Phymatotrichum omnivorum (Shear) Duggar in the southern United States.

Various writers who have worked only incidentally on the genus have given very erroneous figures as to its size. Baker, for instance, in his Fl. Maurit. 255 (1877) says that the genus contains but 50 species; Bentham in Benth. & Hook. f., Gen. Pl. 2 (2): 1154 (1876) raises this to 60 species; Briquet in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 170 (1895) gives the same figure, and so does Wisler in Swarthmore Pl. Notes 1: 217 (1943); Benthall in his "Trees of Calcutta", pages 354--355 (1933) says it has about 70 species. Baker & Stapf in Thiselton-Dyer, Fl. Trop. Afr. 5: 315 (1900) give 100 as the number of species in the genus, while Pearson in Thiselton-Dyer, Fl. Cap. 5: 211 (1901) says it contains about 120 species. Actually, the present count is 380 valid specific and subspecific entities.

The generic name is sometimes inaccurately accredited to Linnaeus, as, for instance, by Wisler in the reference cited above, where he dates it "1737".

The genus is placed in the Labiatae [= Lamiaceae], section Verbeneae, by H. G. L. Reichenbach in Mössler, Handb. Gewächsk., ed. 1, 1: xxxvi (1827) and ed. 3, 1: lxxv (1833); also by him in his Connect. Reg. Veg. 1: 117 (1828). He accredits the name to Linnaeus. He regards Wallrothia Roth, Pyrostoma G. F. W. Mey., and Chrysomallum Thou. as valid genera. Bentham, in Proc. Linn. Soc. Lond. 1: 53 (1857), states that Vitex and Teucrium form a connecting link between the Verbenaceae and Lamiaceae. Junell in Symb. Bot. Upsal. 4: 93--94, 132, 199--200, & 205 (1934) also

places this genus, along with numerous other related genera, in the Lamiaceae.

Rehder in his Bibl. Cult. Trees 584 (1949) refers, perhaps more accurately, to *Vitex agnus-castus* as the "lectotype" of the genus.

The *Allazia jobini* of Manso, Enum. Subst. Braz. 36 (1836) -- inaccurately listed as "*Allasia jobini*" in the Index Kewensis -- seems undoubtedly to be a member of the genus *Vitex*, but its exact identity has not yet been determined. The original description merely states "A. foliis digitatis integerrimis fructibus acutis quinque angulatis" and gives the common name "jaracatiá". The Index Kewensis credits it to Brazil with a question. The Allasia of Loureiro, on the other hand, is certainly *Vitex payos* (Lour.) Merr., native to Africa.

The Brazilian specimens used by Vandelli in making up his Florae Lusitanicae et Brasiliensis (1788) are apparently not preserved anywhere in Portugal. A search for them by botanists of the British Museum through visits to Portuguese herbaria and by correspondence with Portuguese museums has proved fruitless. It is said that Napoleon Bonaparte removed the specimens from Portugal and took them to France. They may possibly be in Paris; if not, they are probably lost, like Velloso's.

The genus *Varegevillaea* of Baillon -- named by him in honor of the town of Varegeville-sur-mer, France -- is based on Seemann's *Colea hispidissima*, which, in turn, has an unnumbered Boivin collection from Madagascar as type. This is actually a mixture of *Vitex congesta* Oliv. flowers and *Rhodocolea racemosa* var. *humblotiana* (H. Bn.) Perrier leaves, as has been pointed out, in part, by Perrier in Not. System. 13: 290--291 (1948).

A species of this genus called "m changwela" is said to be used in the treatment of uterine troubles in Africa. The "*Vitex* sp." described and illustrated by E. E. Galpin in his Bot. Surv. S. Afr. Mem. 7: 23 & 25, fig. 50 (1924) is *V. wilmsii* var. *reflexa* (H. H. W. Pearson) Pieper. The identity of the Herb. Hort. Bot. Bogor. X.D.84, represented by five specimens in the Buitenzorg Herbarium (including sheets no. 25768 and 25769), however, has not yet been determined.

Common names recorded for the genus as a whole or for unidentified species in the genus include the following: "agneau-chaste" (recorded by Necker, Elem. Bot. 1: 328--353. 1790), "bois de la morue", "bois de savanne franc", "chaste tree", "chaste-tree", "chaste-trees", "gatilier", "gatillier", "gattilier" (used by A. L. Juss., Gen. Pl. 119--123. 1789), "hemptree", "kabeljauwhout", "Kenschbaum", "Keuschbaum", "Keuschlamm", "kuischboom", "Maria preta", "maria-preta" (recorded by Le Cointe, A Amaz. Bras. III Arv. 269. 1934), "m changwela", "m chaukel", "Mönchspfeffer", "monks-pepper-tree", "Mulle", "mullen", "Mullen" (used by Willdenow), "rage tree", "renu-kabij", "samaw him", "sham-baloo kabij", "taruma", "tarumã", "tsubru", "tukm-panjangusht", "turuma", "turumar", "um chwaukela", "um kumbru", "umru kwe", "um tentera" (in Rhodesia), "vitex", and "vitice".



French vernacular names are listed in Mirbel, Hist. Nat. Pl., ed. 3, 15: 206 (1805). A. Dugand in *Caldasia* 4: 234 (1946) states that the common name "aceituno", usual in northern South America for members of this genus, is also applied to Godmania aesculifolia (H.B.K.) Standl., of the Bignoniaceae, because of its superficial resemblance to a Vitex.

Personal examination of the Linnean Herbarium in London has revealed the presence of ten specimens there filed under genus "790. Vitex". These, in order, are as follows:

"1. ovata"-- a single specimen, the name written in the handwriting of Smith; inscribed also "H B" [=Herb. Banks]. It is what we now know as Vitex trifolia var. simplicifolia Cham.

"2. altissima" -- a single specimen, the name written in the handwriting of the younger Linnaeus; with a ticket inscribed "Vitex altissima. Foliis ternatis integerrimis. Pedunculis subalatis. Paniculis dichotomis maximis. Baccis trispermi. Mail. Elou. Hort. Malab. P. V. Pag. 1, tab. 1. Habitat in vastis sylvis Zeylonae. König 77"; this is in the handwriting of the younger Linnaeus, according to B. D. Jackson. The leaves are very pubescent beneath, are 3-foliolate, and have the petioles only slightly winged. It is what we now know as Vitex altissima L. f., and may be regarded as the type specimen of that species.

"3." -- a single unnamed specimen inscribed "Vitex ? Flores non observi" and "König 77" -- the ticket and note both in the handwriting of the younger Linnaeus, according to Jackson. The leaves are 3-foliolate, glabrous beneath, with the petiole widely winged from top to bottom. It is what we now call Vitex altissima var. alata (Willd.) Moldenke.

"4. Agnus" -- a single specimen inscribed "Agnus" in the handwriting of Linnaeus and from the Clifford Herbarium. It is plainly what we now call Vitex agnus-castus L.

"5. Leucoxydon" -- a single specimen with a ticket by König reading "Vitex. Foliis quinatis integerrimis. Baccis monospermis. Habitat in vastis sylvis", and a notation "König 77" in the handwriting of the younger Linnaeus. The specific name is also in the handwriting of the younger Linnaeus. The specimen is what we now regard as Vitex leucoxydon L. f. and may be regarded as the type specimen of that species.

"6. trifolia" -- a single specimen with the notation "cagendi laut". The leaves are 5-foliolate, although the two lowest leaflets are very small. The inflorescence-branches are divaricate. It is what we now call Vitex trifolia var. bicolor (Willd.) Moldenke.

"7. trifolia" -- a single specimen with the notations "India" and "413". There is a long description on the reverse side of the sheet. The leaves are 3-foliolate and the inflorescence-branches are divaricate. It is what we now regard as Vitex trifolia L.

"8. Negundo" -- a single specimen. The inflorescence is paniculate, its branches very slender. The leaflets are rather prominently and regularly toothed. It appears to be what we now call

Vitex negundo var. intermedia (P'ei) Moldenke.

"9." -- a single unnamed specimen, with "incisa Lamarck" inscribed in the handwriting of Smith. The lacinations are not very deep, but the specimen is plainly what we now call Vitex negundo var. heterophylla (Franch.) Rehd.

"10. pinnata" -- a single specimen with the notations "Fl. Zeyl. 415" and "India D." [=Dalman]. Smith has struck out the epithet "pinnata" and has written in "minime; nil nisi V. trifoliata J. E. Sm. vera V. pinnata in H. B." [=Banks]. The leaves are 3-foliolate and very white beneath. It is plainly what we now call Vitex trifolia L. [For notes on the true type specimen of Vitex pinnata L., see under that species in following installments of this monograph.]

Many plants have in the past been identified as species of Vitex which in actuality do not belong in that genus at all. Among the binomials proposed in the genus, but really pertaining to species in other genera -- often even in diverse families -- are the following:

Vitex aherniana Merr. = Teijsmanniodendron ahernianum (Merr.) Bakh.

Vitex avicennioides A. Rich. = Pseudocarpidium avicennioides (A. Rich.) Millsp.

Vitex bahiensis Schau. = Arrabidaea bahiensis (Schau.) Sandw. & Moldenke, Bignoniaceae

Vitex californica Benth. = Vitis californica Benth., Vitaceae

Vitex caribaea Benth. = Vitis californica Benth., Vitaceae

Vitex chrysoclada Bojer = Premna chrysoclada (Bojer) Gurke

Vitex coriacea C. B. Clarke = Teijsmanniodendron coriaceum (C. B. Clarke) Kosterm.

Vitex curranii H. J. Lam = Teijsmanniodendron ahernianum (Merr.) Bakh.

Vitex curtifrutescens Elm. = Trichadenia philippinensis Merr., Flacourtiaceae

Vitex domingensis Urb. & Ekm. = Pseudocarpidium domingense (Urb. & Ekm.) Moldenke

Vitex erythrocarpa Salzm. = Aegiphila lhotzkiana Cham.

Vitex esquirolii Lévl. = Buddleia asiatica Lour., Loganiaceae

Vitex euphlebica Merr. = Teijsmanniodendron bogoriense Koord.

Vitex gomphophylla J. G. Baker = Cordia myxa L., Ehretiaceae

Vitex ilicifolia A. Rich. = Pseudocarpidium ilicifolium (A. Rich.) Millsp.

Vitex leichhardtii F. Muell. = Gmelina leichhardtii (F. Muell.) F. Muell.

Vitex lepidota Turcz. = something in the Bignoniaceae

Vitex lignum-vitae A. Cunn. = Premna lignum-vitae (A. Cunn.) Pieper

Vitex longifolia Merr. = Teijsmanniodendron bogoriense Koord.

Vitex lukafuonsis DeWild. = Ricinodendron rautanensis var. lukafuonsis (DeWild.) Pieper, Euphorbiaceae

- Vitex macrophylla R. Br. = Gmelina dalrympliana (F. Muell.) H. J. Lam
- Vitex merrillii H. J. Lam = Teijsmanniodendron bogoriense Koord.
- Vitex microcalyx J. G. Baker = Holmskioldia microcalyx (J. G. Baker) Pieper
- Vitex moluccana Blume = Gmelina moluccana (Blume) Backer
- Vitex mooiensis H. H. W. Pearson = Premna mooiensis (H. H. W. Pearson) Pieper
- Vitex multidens Urb. = Pseudocarpidium multidens (Urb.) Moldenke
- Vitex novae-pommeraniae Warb. = Viticipremna novae-pommeraniae (Warb.) H. J. Lam
- Vitex novo-guineensis Kaneh. & Hatus. = Teijsmanniodendron novo-guineense (Kaneh. & Hatus.) K<sub>o</sub>sterm.
- Vitex peralata King = Teijsmanniodendron pteropodum (Miq.) Bakh.
- Vitex philippinensis Merr. = Teijsmanniodendron pteropodum (Miq.) Bakh.
- Vitex pinnata Lour. = Aglaiia odorata Lour., Meliaceae
- Vitex premnoides Elm. = Mastixia premnoides (Elm.) H. Hallier, Cornaceae
- Vitex pteropoda Miq. = Teijsmanniodendron pteropodum (Miq.) Bakh.
- Vitex punctata Merr. = Teijsmanniodendron hollrungii (Warb.) Kosterm.
- Vitex rigens Griseb. = Pseudocarpidium rigens (Griseb.) Britton
- Vitex sericea Poepp. = Cornutia odorata (Poepp. & Endl.) Poepp.
- Vitex sexdentata Wall. = Caryopteris grata Benth.
- Vitex shaferei Britton = Pseudocarpidium wrightii Millsp.
- Vitex sulfurea J. G. Baker = Premna sulphurea (J. G. Baker) Gürke
- Vitex sulphurea J. G. Baker = Premna sulphurea (J. G. Baker) Gürke
- Vitex syringaefolia J. G. Baker = Cordia syringaefolia (J. G. Baker) Pieper, Ehretiaceae
- Vitex taintoriana Lundell = Godmania aesculifolia (H.B.K.) Standl, Bignoniaceae
- Vitex tracyana F. Muell. = Clerodendrum tracyanum (F. Muell.) F. Muell.
- Vitex turczaninowii Merr. = Viticipremna philippinensis (Turcz.) H. J. Lam
- Vitex vitiensis (Seem.) Seem. = Gmelina vitiensis Seem.
- Vitex wrightii (Millsp.) Urb. = Pseudocarpidium wrightii Millsp.

Specimens in herbaria, identified and filed as "Vitex", have proved upon examination in the course of my monographic studies on this genus over the past 25 years to be Arrabidaea tuberculata P. DC., Cordia spp., Aegiphila gloriosa Moldenke, Tabebuia alba (Cham.) Sandw., Tabebuia aquatilis (E. Mey.) Sprague & Sandw., and Tabebuia ochracea (Cham.) Sandw. The Eastwood s.n. from Honolulu (Gg--34505) is something in the Bignoniaceae; Rusby 2443 is probably something in the Sapindaceae; and Killip & Smith 23927 and Steyermark 38656 are certainly not verbenaceae. The

following collections have been found by me in herbaria, filed under Vitex and identified as Vitex:

- Aguilar Hidalgo 279 = Godmania aesculifolia (H.B.K.) Standl., Bignoniaceae
- Blanchet 2739 = Tabebuia impatiginosa (Mart.) Sandw., Bignoniaceae
- Blanchet 2837 = Setilobus simplicifolius (P. DC.) K. Schum., Bignoniaceae
- W. E. Broadway 425 = Tabebuia billbergii (Bur. & K. Schum.) Standl., Bignoniaceae
- Burchell 1669 = Arrabidaea agnus-castus (Cham.) P. DC., Bignoniaceae
- Chickering 59 = Arrabidaea florida P. DC., Bignoniaceae
- Curran & Haman 399 = Tabebuia serratifolia (Vahl) Nichols., Bignoniaceae
- Curran & Haman 459 & 587 = Tabebuia billbergii (Bur. & K. Schum.) Standl., Bignoniaceae
- Dugand D.71 = Tabebuia coralibe Standl., Bignoniaceae
- Galeotti 7060d = Adenocalymna hintoni Sandw., Bignoniaceae
- G. Gardner 5030 = Tynanthus fasciculatus (Vell.) Miers, Bignoniaceae
- Glaziou 12996 = Arrabidaea subexserta Bur. & K. Schum., Bignoniaceae
- Hahn s.n. = Aegiphila deppeana Steud., Verbenaceae
- M. E. Jones 23032 = Tabebuia chrysantha (Jacq.) Nichols., Bignoniaceae
- Karsten s.n. = Godmania aesculifolia (H.B.K.) Standl., Bignoniaceae
- Lüfgren 495 = Tynanthus elegans (Cham.) Miers, Bignoniaceae
- Martius 514 = Arrabidaea subincana P. DC., Bignoniaceae
- Paul 28 = Godmania aesculifolia (H.B.K.) Standl., Bignoniaceae
- Peckolt 150 = Joannesia princeps Vell., Euphorbiaceae
- Pittier 6720 = Godmania aesculifolia (H.B.K.) Standl., Bignoniaceae
- Ploem 9 = Desmodium sp., Fabaceae
- Pohl 1816 = Arrabidaea agnus-castus (Cham.) P. DC., Bignoniaceae
- Rose & Russell 20736 = Joannesia princeps Vell., Euphorbiaceae
- Sagot s.n. = Stizophyllum sp., Bignoniaceae
- Skutch 910 = Caryocar sp., Caryocaraceae
- Skutch 2012 = Aegiphila costaricensis Moldenke, Verbenaceae
- Steinbach 5248 = Arrabidaea florida P. DC., Bignoniaceae
- Steinbach 5607 = Didymopanax morototoni Decne. & Planch., Araliaceae
- Ll. Williams 1806 = Tabebuia heteropoda (P. DC.) Sandw., Bignoniaceae
- C. Wright 434 = Schlegelia brachyantha Griseb., Scrophulariaceae

On the other hand, I have found specimens of Vitex labeled in herbaria as Arrabidaea, Cornutia, Mithridatea, Oxalis, Pekea,

Piper, and Tanaecium. Vitex specimens are often found in herbaria mis-filed under the genus Vitis, and vice versa, because of the similarity in the name. The conclusion is obvious: not everything found in herbaria under "Vitex" is actually Vitex, and not all of an institution's Vitex specimens will be found under "Vitex" in its herbarium.

In the citation of the thousands of specimens examined in the preparation of this monograph over the past 25 years abbreviations for the names of herbaria will be used which should be explained here. I have used these abbreviations in all of my publications over which I have had editorial control during this past quarter century. It seems most desirable to continue with this system so that there will be uniformity in all my writings, rather than to shift now to another system.

- A = Arnold Arboretum, Jamaica Plain, Massachusetts  
 Aa = H. Ahles Herbarium, New York City  
 Af = National Herbarium, Pretoria, Transvaal, Union of S. Africa  
 Ah = Arthur Herbarium, Purdue University, Lafayette, Indiana  
 Ak = Alan Hancock Foundation, University of Southern California, Los Angeles, California  
 Al = New York State Museum, Albany, New York  
 An = Institut Franais d'Afrique Noir, Dakar, Senegal  
 Ar = United States National Arboretum, Washington, D. C.  
 As = C. F. Asenjo Herbarium, University of Wisconsin, Madison  
 Au = University of Texas, Austin, Texas  
 B = Botanisches Museum und Garten, Berlin-Dahlem, Germany  
 Ba = Bailey Hortorium, Cornell University, Ithaca, New York  
 Bb = Barbados Museum and Historical Society, Bridgetown, Barbados  
 Bc = Barnard College, Columbia University, New York City  
 Be = Instituto Agronomico do Norte, Belem, Brazil  
 Bg = Bergens Museum, Bergen, Norway  
 Bh = Instituto Agronomico do Servico Publica de Estado, Belo Horizonte, Minas Geraes, Brazil  
 Bi = Bernice P. Bishop Museum, Honolulu, Hawaii  
 Bj = B. J. Bayer Herbarium, Jamaica, Long Island, New York  
 Bk = Royal Forestry Department, Bangkok, Thailand  
 Bl = University of Colorado, Boulder, Colorado  
 Bm = British Museum (Natural History), London, England  
 Bo = Instituto de la Salle, Bogota, Colombia  
 Br = Jardin Botanique de l'Etat, Brussels, Belgium  
 Bt = Butler University, Indianapolis, Indiana  
 Bu = W. M. Buswell Herbarium, University of Miami, Coral Gables, Florida  
 Bv = Bureau of Plant Industry Station, Beltsville, Maryland  
 By = Brooklyn College, Brooklyn, New York City  
 Bz = Herbarium Bogoriense, Buitenzorg, Java, Indonesia  
 C = Columbia University, New York City  
 Ca = University of California, Berkeley, California  
 Cb = Delessert Herbarium, Conservatoire et Jardin Botaniques, Geneva, Switzerland  
 Cc = Colorado College, Colorado Springs, Colorado  
 Ch = Carey Herbarium, Royal Botanic Gardens, Kew, England

- Ci = Escuela Superior Agricultura Tropical, Cali, Colombia  
Cl = Royal Botanic Gardens, Calcutta, India  
Cm = Carnegie Museum, Pittsburgh, Pennsylvania  
Cn = University of Cincinnati, Cincinnati, Ohio  
Co = North Appalachian Experimental Watershed, Coshocton, Ohio  
Cp = Universitetets Botaniske Museum, Copenhagen, Denmark  
Cr = J. Carabia Herbarium, Sansalito, California  
Cs = Department of Biology, Agricultural and Mechanical College of Texas, College Station, Texas  
Ct = Bolus Herbarium, University of Capetown, Capetown, Union of South Africa  
Cu = Cambridge University, Cambridge, England  
Cz = Canal Zone Biological Area, Barro Colorado Island, Canal Zone  
D = Academy of Natural Sciences, Philadelphia, Pennsylvania  
Da = United States Department of Agriculture, Washington, D. C.  
Dc = De Candolle Herbarium, Conservatoire et Jardin Botaniques, Geneva, Switzerland  
Dd = Botanic Gardens, Dehra Dun, United Provinces, India  
De = Delzie Demaree Herbarium, Monticello, Arkansas  
Dg = Otto Degener Herbarium, Waialua, Hawaii  
Di = Carthage College, Carthage, Illinois  
Dm = C. C. Deam Herbarium, Bluffton, Indiana  
Dp = DePauw University, Greencastle, Indiana  
Dr = Botanisches Institut, Dresden, Germany  
Du = Dudley Herbarium, Stanford University, Stanford, California  
Dv = Botany Department, College of Agriculture, Davis, California  
E = Missouri Botanical Garden, Saint Louis, Missouri  
Ea = Earlham College, Earlham, Indiana  
Ec = Universidad Nacional de Loja, Loja, Ecuador  
Ed = Royal Botanic Garden, Edinburgh, Scotland  
El = José Eugenio Leite Herbarium, Novo Friburgo, Rio de Janeiro, Brazil  
En = J. Ewan Herbarium, New Orleans, Louisiana  
Er = Palynologiska Laboratoriet, Bromma, Sweden  
Es = Estacion Experimental Agronomica, Santiago de las Vegas, Havana, Cuba  
Ew = Erik Wall Herbarium, Stockholm, Sweden  
F = Chicago Natural History Museum, Chicago, Illinois  
Fc = Colorado Agricultural and Mechanical College, Fort Collins, Colorado  
Fl = University of Florida, Gainesville, Florida  
Fn = Facultad Nacional de Agronomia, Universidad Nacional, Medellin, Colombia  
Fo = Instituto Botanico della Universita, Florence, Italy  
Fs = Forrest Shreve Herbarium, University of Arizona, Tucson, Arizona  
Fx = Loretta E. Fox Herbarium, Natchitoches, Louisiana  
G = Gray Herbarium, Harvard University, Cambridge, Massachusetts  
Ga = Georgia Agricultural Experiment Station, Experiment, Georgia  
Ge = H. S. Gentry Herbarium, Tucson, Arizona  
Gg = California Academy of Sciences, San Francisco, California  
Gm = Wallich Herbarium, Royal Botanic Gardens, Kew, England

- Go = Botaniska Trädgård, Göteborg, Sweden  
Gt = Botanische Anstalten, Göttingen, Germany  
Gu = University of Georgia, Athens, Georgia  
H = Duke University, Durham, North Carolina  
Ha = Colegio de la Salle, Vedado, Havana, Cuba  
Hb = H. Bassler Herbarium, New York Botanical Garden, New York  
He = W. G. Herter Herbarium, Montevideo, Uruguay  
Hk = University of Helsinki, Helsinki, Finland  
Hn = Herbario Nacional Colombiano, Instituto Ciencias Naturales, Bogotá, Colombia  
Hp = H. Hapeman Herbarium, Minden, Nebraska  
Hq = Instituto Botanico Dr. Julio Henriques, Coimbra, Portugal  
Hs = Crispus Attucks High School, Indianapolis, Indiana  
Hu = Sam Houston State Teachers College, Huntsville, Texas  
Hv = Academia de Ciencias, Havana, Cuba  
Hw = Howard University, Washington, D. C.  
I = Langlois Herbarium, Catholic University of America, Washington, D. C.  
Id = University of Idaho, Southern Branch, Pocatello, Idaho  
Il = Illinois State Museum, Springfield, Illinois  
In = Indiana University, Bloomington, Indiana  
Io = Iowa State College, Ames, Iowa  
It = Cornell University, Ithaca, New York  
J = Brooklyn Botanic Garden, Brooklyn, New York City  
Ja = Museu Nacional, Rio de Janeiro, Brazil  
Jc = J. Cuatrecasas Herbarium, Bensenville, Illinois  
Je = William Jewell College, Liberty, Missouri  
Jn = Aage Bohus-Jensen Herbarium, Lyngby, Denmark  
Jr = Hebrew University, Jerusalem, Israel  
K = Royal Botanic Gardens, Kew, England  
Ka = Kansas State College, Manhattan, Kansas  
Ke = Kern Herbarium, Pennsylvania State College, State College, Pennsylvania  
Kg = Department of Agriculture, Kagoshima University, Kagoshima, Japan  
Ki = E. P. Killip Herbarium, University of Rochester, Rochester, New York  
Kr = B. A. Krukoff Herbarium, Smithtown, New York  
Ku = Eberhard Kausel Herbarium, Santiago, Chile  
Ky = University of Kentucky, Lexington, Kentucky  
L = Jardin Botanique Principal, Leningrad, Russia  
La = University of California at L. A., Los Angeles, California  
Ld = C. L. Lundell Herbarium, Dallas, Texas  
Le = Rijksherbarium, Leiden, Netherlands  
Lg = Fritz Lemperg Herbarium, Hatzendorf, Steiermark, Austria  
Lh = Laboratory Herbarium, Department of Botany, Barnard College, Columbia University, New York City  
Li = Colegio Salesiano, Lima, Peru  
Ll = Lloyd Library, Cincinnati, Ohio  
Lm = Los Angeles County Museum, Los Angeles, California  
Lo = Gualterio Looser Herbarium, Santiago, Chile  
Ls = Linnean Herbarium, Linnean Society, London, England

- Lu = Botanisk Museum, University of Lund, Lund, Sweden  
 Lw = University of Kansas, Lawrence, Kansas  
 M = Meisner Herbarium, New York Botanical Garden, New York City  
 Ma = Forest Department of Malaya, Kepong, Selangor, Malaya  
 Mb = Melbourne Botanic Gardens, Melbourne, Victoria, Australia  
 Mc = J. B. McFarlin Herbarium, Sebring, Florida  
 Md = University of Maryland, College Park, Maryland  
 Me = Instituto de Biologia, Universidad Nacional de México, Mexico City, Mexico  
 Mg = Montreal Botanical Garden, Montreal, Quebec, Canada  
 Mh = Matuda Herbarium, Mexico City, Mexico  
 Mi = University of Michigan, Ann Arbor, Michigan  
 Mk = F. C. MacKeever Herbarium, Mount Vernon, New York  
 Ml = Instituto Miguel Lillo, Tucumán, Argentina  
 Mn = University of Montana, Missoula, Montana  
 Mo = Morris Arboretum, Philadelphia, Pennsylvania  
 Mp = Museo Paranaense, Curitiba, Paraná, Brazil  
 Mr = Morehead State College, Morehead, Kentucky  
 Ms = University of Massachusetts, Amherst, Massachusetts  
 Mt = Mary Thais Herbarium, St. Mary's High School, Perth Amboy, New Jersey  
 Mu = Botanisches Museum, Munich, Germany  
 Mv = Marie-Victorin Herbarium, Montreal Botanical Garden, Montreal, Quebec, Canada  
 N = Britton Herbarium, New York Botanical Garden, New York City  
 Na = Natal Government Herbarium, Durban, Natal, Union of South Africa  
 Nc = State Normal College, Natchitoches, Louisiana  
 Nd = Notre Dame University, Notre Dame, Indiana  
 Nj = New Jersey College for Women, New Brunswick, New Jersey  
 Nm = Newark Museum, Newark, New Jersey  
 No = North Carolina State College, Raleigh, North Carolina  
 Nt = North Texas State Teachers College, Denton, Texas  
 O = University of Tennessee, Knoxville, Tennessee  
 Oa = Oakes Ames Economic Herbarium, Botanical Museum, Harvard University, Cambridge, Massachusetts  
 Ob = Oberlin College, Oberlin, Ohio  
 Ok = University of Oklahoma, Norman, Oklahoma  
 Ol = Universitetets Botaniske Museum, Oslo, Norway  
 Om = Omer E. Sperry Herbarium, Alpine, Texas  
 Or = Oregon State College, Corvallis, Oregon  
 Os = Osborn Botanical Laboratory, <sup>Y</sup>ale University, New Haven, Connecticut  
 Ot = National Herbarium of Canada, Ottawa, Ontario, Canada  
 Ox = Oxford University, Oxford, England  
 P = Muséum National d'Histoire Naturelle, Paris, France  
 Pa = College of Pharmacy Herbarium, New York Botanical Garden, New York City  
 Pb = R. Probst Herbarium, Langendorf, Switzerland  
 Pc = Philip Cheitman Herbarium, New York City  
 Ph = Philippine Bureau of Science, Manila, Philippine Islands  
 Pi = Polytechnic Institute of Puerto Rico, San Germán, P. R.



- Pl = State College of Washington, Pullman, Washington  
Pn = Parque Nacional da Serra dos Orgãos, Terezopolis, Brazil  
Po = Pomona College, Claremont, California  
Pr = Princeton University Herbarium, New York Botanical Garden,  
New York City  
Pu = Purdue University, Lafayette, Indiana  
Q = Jardin Botanico, Madrid, Spain  
Qi = W. C. Werner Herbarium, Painesville, Ohio  
Qu = North Queensland Herbarium, North Queensland Naturalists  
Club, Cairns, Queensland, Australia  
R = Trinidad & Tobago Botanical Garden, Port-of-Spain, Trinidad  
Ra = Museo Nacional de Historia Natural, Buenos Aires, Argentina  
Rb = Colegio Anchieta, Porto Alegre, Brazil  
Rd = Herbario Barbosa Rodrigues, Itajai, Santa Catharina, Brazil  
Re = R. E. Schultes Herbarium, Cambridge, Massachusetts  
Rg = J. T. Roig Herbarium, Estacion Experimental Agronomica,  
Santiago de las Vegas, Havana, Cuba  
Rh = Government Herbarium, Causeway, Salisbury, Southern Rhodesia  
Rl = Herbario Ruiz Leal, Codoy Cruz, Mendoza, Argentina  
Ro = Santa Rosa Junior College, Santa Rosa, California  
Rr = Robert Runyon Herbarium, Brownsville, Texas  
Rs = Rancho Santa Ana, Anaheim, California  
Ru = Rutgers University, New Brunswick, New Jersey  
S = Naturhistoriska Riksmuseum, Stockholm, Sweden  
Sa = Henry R. Carter Memorial Laboratory, Savannah, Georgia  
Sc = Colegio Notra Señora de la Caridad, Santiago, Cuba  
Sd = San Diego Society of Natural History, San Diego, California  
Se = University of Washington, Seattle, Washington  
Sf = Serviço Florestal do Estado, São Paulo, Brazil  
Sg = Museo de Historia Natural, Santiago, Chile  
Sh = Blythe Sherwood Herbarium, Pawling, New York  
Si = Instituto Darwinion, San Isidro, Argentina  
Sm = Southern Methodist University, Dallas, Texas  
Sp = Jardim Botanico, São Paulo, Brazil  
Sq = E. R. Squibb and Sons, New York City  
Sr = Sul Ross Teachers College, Alpine, Texas  
Ss = Science Service, Department of Agriculture, Ottawa, Canada  
St = Oklahoma Agricultural and Mechanical College, Stillwater,  
Oklahoma  
Sw = J. Otis Swift Herbarium, New York City  
Sz = A. G. Schulz Herbarium, Colonia Benítez, Argentina  
T = Torrey Herbarium, New York Botanical Garden, New York City  
Tc = Torrey Botanical Club Herbarium, New York Botanical Garden,  
New York City  
Th = Thunberg Herbarium, Botaniska Institutionen, Uppsala, Sweden  
Tj = University of Santo Domingo, Ciudad Trujillo, Dominican Re-  
public  
Tl = Tulane University, New Orleans, Louisiana  
Tm = Transvaal Museum, Pretoria, Transvaal, Union of South Africa  
To = United States Field Station, Sacaton, Arizona  
Tr = S. M. Tracy Herbarium, Texas Agricultural Experiment Stat-  
ion, College Station, Texas

- Tu = University of Arizona, Tucson, Arizona  
 U = Jenman Herbarium, Botanic Gardens, Georgetown, British Guiana  
 Ua = Utah State Agricultural College, Logan, Utah  
 Ug = Museo de Historia Natural, Montevideo, Uruguay  
 Up = University of Pennsylvania, Philadelphia, Pennsylvania  
 Ur = University of Illinois, Urbana, Illinois  
 Us = Botaniska Institutionen, Uppsala, Sweden  
 Ut = Botanisch Museum en Herbarium, Utrecht, Netherlands  
 V = Naturhistorisches Museum, Vienna, Austria  
 Va = Vanderbilt University, Nashville, Tennessee  
 Ve = Museo Comercial de Venezuela, Caracas, Venezuela  
 Vi = Marie-Victorin Herbarium, Montreal, Quebec, Canada  
 Vl = Facultad de Agronomia del Valle, Valle del Cauca, Colombia  
 Vt = University of Vermont, Burlington, Vermont  
 Vu = Botanisches Institut der Universität, Vienna, Austria  
 Vx = Växtbiologiska Institutionen, Uppsala Universitets, Uppsala, Sweden  
 W = United States National Museum, Smithsonian Institution, Washington, D. C.  
 Wb = Wilson Brown Herbarium, Jesuit Tertianship, Auriesville, New York  
 We = West Virginia University, Morgantown, West Virginia  
 Wh = Faculdade de Farmacia e Odontologia, Universidad de São Paulo, São Paulo, Brazil  
 Wi = Witte Memorial Museum, San Antonio, Texas  
 Wl = William Lucian Herbarium, Waterbury, Connecticut  
 Wx = Max Gordon Herbarium, New York City  
 X = Herbarier Boissier, Conservatoire et Jardin Botaniques, Geneva, Switzerland  
 Xa = Blatter Herbarium, Saint Xavier's College, Bombay, India  
 Y = Yale School of Forestry, New Haven, Connecticut  
 Z = H. N. Moldenke Herbarium, Yonkers, New York

The "African oak" or "teak" mentioned under Vitex by Bentham in Hook., Niger Fl. 487 (1849) is actually Oldfieldia africana Hook. f. in the Euphorbiaceae.

Darlington & Janaki Ammal in their "Chromosome Atlas of Cultivated Plants", page 271 (1945) say that the x number of chromosomes in Vitex is 6 and 8.

VITEX ACUMINATA R. Br., Prodr. 512. 1810.

Literature: R. Br., Prodr. 512. 1810; F. Muell., Fragm. 5: 35. 1865; Benth., Fl. Austral. 5: 67--68. 1870; H. J. Lam, Verbenac. Malay. Arch. 369. 1919; Moldenke, Known Geogr. Distrib. Verbenac. [ed. 1], 70 & 102 (1942), ed. 2, 154 & 200. 1949.

Synonymy: Vitex meliceopea F. Muell., Fragm. 5: 35. 1865. Vitex melieopea F. Muell. apud Benth., Fl. Austral. 5: 68, sphalm. 1870.

Kajewski states that this species is common in the rain forest, that it is a tree up to 80 feet tall, with an invariably hollow trunk, and with red fruit in January. The Vitex acuminata Korth. ex H. J. Lam, Verbenac. Malay. Arch. 369, in syn. (1919)

is actually V. gamosepala var. kunstleri King & Gamble. The only collections of those cited below that are definitely from Queensland are those of Kajewski. It is assumed that the others are also from that state, although their labels do not so specify.

The type collection is said by Bentham in his Fl. Austral. 5: 68 (1870) to have been collected by Brown at Rockhampton. In his original description Brown does not state definitely from which of the several localities included in his area "T" the type came. Bentham also suggests that V. timoriensis Walp. may be conspecific with V. acuminata, but I regard it as a synonym of V. parviflora A. L. Juss. Bentham also cites an unnumbered collection of A. Cunningham from the Northern Territory and unnumbered specimens of Bidwell, Daemel, Dallachy, W. Hill, and J. MacGillivray from Queensland. The type of Vitex melicopea is an unnumbered collection by Thozet & Dallachy from Rockhampton, Queensland.

Citations: AUSTRALIA: Queensland: R. Brown 2320 (C--isotype); Kajewski 55 (La), s.n. [North from Gympie] (Bz--23794, N--photo, Z--photo); F. von Müller s.n. [Rockhampton] (T); Thozet s.n. [Australie, 1870] (Br). MOUNTED ILLUSTRATIONS: Ferd. Bauer Icon. Nov. Holl. 954 (V), 954a (V), s.n.(V).

VITEX AGELAEIFOLIA Mildbr. ex Pieper in Engl., Bot. Jahrb. 62, Beibl. 141: 55. 1928.

Literature: Mildbr., Wiss. Ergebn. Zent. Afr. Exped. 1910/1911 2: 80. 1922; Pieper in Engl., Bot. Jahrb. 62, Beibl. 141: 55. 1928; Moldenke, Alph. List Invalid Names 51. 1942; Moldenke, Known Geogr. Distrib. Verbenac. [ed. 1], 48 & 102 (1942), ed. 2, 114 & 200. 1949; Moldenke, Phytologia 4: 72. 1952.

This binomial actually appears first in the 1922 reference cited above, but only as a hyponym without legal taxonomic standing under the present International Rules of Botanic Nomenclature. Pieper, in 1928, reduces this 1922 binomial to synonymy under Vitex phaseolifolia Mildbr. He then accepts the same binomial for the present species, based on Tessmann 289 and 321 as cotypes from Spanish Guinea. He accredits it also to Mildbraed, who used it as a cheironym on the Berlin specimens of these collections. Pieper gives no formal description, but includes it in his elaborate key to species, from which a validating description may be assembled. He states, further, that it resembles V. phaseolifolia, but differs in its inflorescences and in its obliquely streaked leaves. The Lebrun specimen cited below has very sharply 4-angled stems.

The species is said to be a liana with white flowers, growing in forests. It has been collected in anthesis in September and in fruit in April. In my 1942 publication, cited above, I erroneously dated Mildbraed's first binomial as "1911".

Citations: BELGIAN CONGO: Bequaert 6722 (Br); L. Dubois 893 (Br), 1018 (Br, Br); Lebrun 5847 (Br, Br); Vanderyst 27008 (Br, N), 27068 (Br). LOCALITY OF COLLECTION UNDETERMINED: Herb. Jard. Colon. Lisboa 7675 (N).

VITEX AGELAEIFOLIA var. RUFULA Moldenke, *Phytologia* 4: 58. 1952.

Citations: BELGIAN CONGO: Overlaet 1263 (Br--isotype, Br--isotype, Br--type, N--isotype, N--photo of type, Z--photo of type).

VITEX AGNUS-CASTUS L., *Sp. Pl.*, ed. 1, 638 [as "Agnus Castus"].

1753; Schau. in A. DC., *Prodr.* 11: 684. 1847.

Literature: Anguillara, *Sempl.* 64. 1561; Matthioli, *Comment.* 1: 152 & 177. 1563; Caesalp., *De Fl. Lib.* 3, cap. 51: 128. 1583; Durante, *Herb. Nuov.*, ed. Roma, 4 & 11. 1585; Camerarius in Matthioli, *De Fl. Epit.* 105. 1586; Dalechamps, *Hist. Gen. Pl.* 281. 1587; Lobel, *Icon.* 2: 138. 1591; Gerarde, *Herball* 1387-1388. 1597; Dodoens, *Stirp. Hist. Pemp.* 774. 1616; Dodoens, *Cruydt-Boeck* 1213. 1618; Parkinson, *Theatr. Bot.* 1437. 1640; Castelli, *Hort. Mess.* 24. 1640; J. Bauhin, *Hist. Plant. Univers.* 1 (6): 205. 1650; A. Bauhin, *Pin.* 475. 1671; Cupani, *Hort. Cathol.* 4. 1696; Magnol, *Hort. Reg. Monspel.* 7. 1697; Cupani, *Suppl. Alt.* 5--6. 1697; Boerhaave, *Index Alt. Plant.* 2: 222. 1720; Zanichelli, *Opusc. Bot. Posth.* 21 & 33. 1730; L., *Hort. Cliff.* 327. 1737; Royen, *Fl. Leyd. Prod.* 291. 1740; Geoffroy, *Tract. Mat. Med.* 3: 44. 1741; L., *Sp. Pl.*, ed. 1, 638. 1753; Blackwell, *Herb. Blackw.* pl. 139. 1757; Gron., *Fl. Virg.* 169. 1762; Kniphof, *Herb. Viv.* 2: pl. 1190. 1764; Mill., *Gard. Dict.*, ed. 3, no. 2. 1768; C. Alston, *Lect. Mat. Med.* 2: 321. 1770; Regnault, *Bot.* 3: 85. 1774; Bergius, *Mat. Med.* 2: 550, pl. 450. 1778; Lam., *Fl. Franc.* 2: 263. 1778; *Medic.*, *Act. Acad. Theod. Palat.* 4, *Phys.* 202, pl. 8. 1780; *Medic.*, *Beobacht.* 313. 1782; Bergeret, *Phyt. Univ.* 1: pl. 45. 1783; Zorn.,  *Ic. Pl. Med.* 5: pl. 450. 1784; All., *Fl. Pedem.* 1: 124. 1785; Gaertn., *Fruct. & Sem. Pl.* 1: pl. 56. 1788; Ait., *Hort. Kew.* 2: 365. 1789; Ucria, *Hort. Reg. Pan.* 266. 1789; Plenck, *Icon. Fl. Med.* 6: 13, pl. 510. 1794; Woodville, *Med. Bot. Suppl.* pl. 222. 1794; Joh. Kerner, *Abbild. Oek. Pfl.* (*Fig. Pl. Econ.*) 8: pl. 746. 1796; Joh. Kerner, *Ausl. Ind. Bäume & Gestr.* pl. 41. 1796; Salisb., *Prod. Stirp.* Chap. Allert. 106. 1796; Lam., *Illustr.* 3: pl. 541, fig. 1. 1797; Ostkamp, *Afb. Artseny-Gewass.* 5: pl. 497. 1800; A. Rich. in Marthe, *Cat. Pl. Jard. Méd. Paris* 67. 1801; Duham., *Traité Arbres & Arbust.*, ed. 2, 6: pl. 35. 1801--1819; DC. & Lam., *Syn. Fl. Gall.* 217. 1806; Roques, *Pl. Usuell. Indig. & Exot.* 1: pl. 14. 1807; Schkuhr, *Bot. Handb.*, ed. 2, pl. 177. 1808; Jaume Saint-Hilaire, *Fl. France* 2: [pl. 63]. 1808; Stokes, *Bot. Mat. Med.* 3: 413. 1812; Chaumeton, *Fl. Méd.* 1: pl. 8. 1815; Lam. & DC., *Fl. Franç.* 3: 502. 1815; Sebast. & Mauri, *Fl. Rom. Prodr.* 199. 1818; Vietz, *Ic. Pl. Med.-oec.-techn.* 10: pl. 918. 1819; Jaume Saint-Hilaire, *Traité Arbriss. & Arbustes* 1: pl. 78. 1825; Tenore, *Fl. Nap.* 29. 1826; Gussone, *Fl. Sic. Prodr.* 2: 147. 1828; Duby in P. DC., *Bot. Gall.* 2: 377. 1830; Loud., *Encycl. Pl.* 520. 1829; Sibthorp & Sm., *Fl. Graeca* 7: pl. 609. 1830; Tenore, *Sylloge* 36 & 298, no. 1. 1831; Woodville, *Med. Bot.*, ed. 3, 2: pl. 137. 1832; J. C. Loud., *Arbor. & Frutic. Brit.* 3: 1235. 1838; Nees, *Gen. Pl. Gamop.* 2: pl. 51. 1843; Gussone, *Fl. Sic. Syn.* 2: 110. 1844; Schau. in A. DC., *Prodr.* 11: 682--684. 1847; Lindl., *Med. & Oecon. Bot.* 223. 1849;

Petermann, *Deutsch. Fl.* pl. 72, fig. 564. 1849; Gussone, *Enum. Pl. Vasc. Inarim.* 252. 1854; Reichenb.,  *Ic. Fl. Germ.* 18: pl. 1293. 1857; Tornabene, *Atti Accad. Gioen. Scienz. Nat. Catania*, ser. 2, 16: 119--122 & 125, pl. 3, fig. A. 1860; Berg, *Charakt.* pl. 36, fig. 281. 1861; Ettingsh., *Blatt-Skel. Dikot.* 80--81, fig. 43. 1861; Pokorny, *Oesterr. Holzpfl.* 482, pl. 36. 1864; Argenta, *Album Fl. Med.-Farm.* 3: pl. 239. 1864; Cesati, *Passer*, & Gibelli, *Comp. Fl. Ital.*, 327, pl. 49, fig. 1. 1867--1886; Le Maout & Decaisne, *Traité Gén. Bot.* 205. 1868; Lebas, *Rev. Hort.* 30. 1869; Réveil, *Règne Vég. 14*: pl. 37. 1870; Fraas, *Syn. Pl. Flor. Class.* 188. 1870; Carr., *Rev. Hort.* 1870: 415. 1871; Morgridge, *Fl. Mentone* pl. 14. 1871; Peyritsch, *Sitzb. Akad. Wiss. Wien* 66 (1): pl. 3. 1872; Cusin, *Herb. Fl. Franc.* 18 (*Verbenac.*): pl. 2. 1875; Kurz, *For. Fl. Brit. Burma* 270. 1877; Boiss., *Fl. Orient.* 4: 535. 1879; Lauche, *Deutsche Dendrol.*, ed. 2, 153. 1883; Schlecht., Lang, & Schenk, *Fl. Deutschl.*, ed. 5, 19: pl. 1880. 1884; Tristram, *Surv. West. Palest.*, ed. 1, 378. 1884; Nicholson, *Illustr. Dict. Gard.* 4: 186. 1887; Tristram, *Surv. West. Palest.*, ed. 2, 378. 1888; Baill., *Hist. Pl.* 11: 85. 1891; H. C. Hart, *Some Account Fauna Fl. Sinai* 104. 1891; Kuntze, *Rev. Gen. Pl.* 2: 510--511. 1891; Meehan's *Monthly* 2: 44. 1892; Acloque, *Fl. France* 527. 1894; Briq. in *Engl. & Prantl, Nat. Pflanzenfam.* 4 (3a): 171. 1895; Jacks., *Ind. Kew.* 2: 1213. 1895; Madaus, *Am. Journ. Physiol.* 1: 444. 1898; *Journ. Roy. Hort. Soc. Lond.* 22: 477. 1893--1899; Fiori & Paol., *Ic. Fl. Ital.* 330, fig. 3217. 1902; Penzig, *Fl. Litt. Méditerr.* pl. 77. 1902; Earle, *Bull. Ala. Agr. Exp. Sta.* 119: 101. 1902; Rehd. in L. H. Bailey, *Cycl. Am. Hort.* 4: 1947. 1902; Schneid., *Dendrol. Winterst.* 138. 1903; Small, *Fl. Southeast. U. S.*, ed. 1, 1015--1016. 1903; *Bot. Knogr. Wien II Exk.* pl. 13. 1905; Strasburger, *Rambles Riviera* 415. 1906; Coste, *Fl. France* 3: 140. 1906; *Beih. Bot. Centralbl.* 20: 118. 1906; Lazaro, *Comp. Fl. España.* 2: 576. 1907; Beille, *Bot. Pharm.* 2: 1079. 1909; Rouy, *Fl. France* 11: 218. 1909; Apgar, *Ornament. Shrubs U. S.* 29-, fig. 506. 1910; Fedtschenko & Fler., *Fl. Eur. Russ.* 796. 1910; *Garden* 75: 546. 1911; Schneid., *Ill. Handb. Laubh.* 2: 592--593. 1911; Wettstein, *Handb. Syst. Bot.*, ed. 2, 739. 1911; Van Wijk, *Dict. Pl. Names* 1: 1419--1420. 1911; *Gard. Chron.*, ser. 3, 51: 52. 1912; *Bull. Soc. Dendr. France* 1913: 110 & 233. 1913; Pitard, *Expl. Scient. Maroc. Bot.* 1912 (1): pl. 1. 1913; Small, *Fl. Southeast. U. S.*, ed. 2, 1015--1016. 1913; *Hand.-Mazz.*, *Ann. Hofmus. Wien* 27: 403. 1913; H. S. Thompson, *Fl. Pl. Riviera* pl. 23. 1914; Nash, *Addisonia* 1: 35, pl. 18. 1916; Van Wijk, *Dict. Pl. Names* 2: 4, 21, 190, 192, 278, 450, 466, 540, 676, 691, 816, 879, 1007, 1008, 1024, 1121, 1136, 1141, 1170, 1295, 1320, 1504, & 1508. 1916; *Notizbl. Bot. Gart. Berlin* 7: 25. 1917; *Garden* 83: 487. 1919; H. J. Lam, *Verbenac. Malay. Arch.* 130 & 369. 1919; Bonnier, *Fl. Compl. France Suisse & Belg.* 9: pl. 498. 1927; Hegi, *Ill. Fl. Mittel-Eur.* 5 (3): 2236--2237. 1927; Rehd., *Man. Cult. Trees* 777. 1927; Cyrén & Hayek in *Karst. & Schenck, Veg.-Bild.* 18: pl. 32. 1928; F. Norton in *Karst. & Schenck, Veg.-Bild.* 19: pl. 36. 1928; R. V. Harper, *Econom. Bot. Ala.* 2: 312. 1928; Dalman, *Arbeit & Sitte Paläst.* 1: 56. 1928;

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592--593. 1911; Wettstein, Handb. Syst. Bot., ed. 2, 739. 1911; Gard. Chron., ser. 3, 51: 52. 1912; Bull. Soc. Dendr. France 1913: 110 & 233. 1913; Pitard, Expl. Scient. Maroc. Bot. 1912 (1): pl. 1. 1913; H. S. Thompson, Fl. Pl. Riviera pl. 23 (colored). 1914; Nash, Addisonia 1: pl. 18 (colored). 1916; Garden 83: 487. 1919; Bonnier, Fl. Compl. France Suisse & Belg. 9: pl. 498 (colored). 1927; Hegi, Ill. Fl. Mittel-Eur. 5 (3): 2236. 1927; Cyrén & Hayek in Karst. & Schenck, Veg.-Bild. 18: pl. 32. 1928; F. Morton in Karst. & Schenck, Veg.-Bild. 19: pl. 36. 1928; Javorka & Csapody, Ic. Fl. Hungar. 418. 1932; C. M. King, Iowa Acad. Sci. Proc. 39: fig. 11. 1932; Bedevian, Illustr. Polyglott. Dict. Pl. Names 617. 1936; Journ. N. Y. Bot. Gard. 43: 37. 1942; Hottes, Book of Shrubs 404. 1942; A. C. Martin, Am. Midl. Nat. 36: pl. 50. 1946; Aul, N. Y. Herald Trib., sect. 5, p. 11, May 8, 1949; Stumpp & Walter, 1950 Gard. Ann. 80. 1950; Gleason, New Britt. & Br. Ill. Fl. 3: 139. 1952.

Synonymy: Vitice e ciò è agno castro Anguillara, Sempl. 64. 1561. Vitex Matthioli, Comment. 1: 152. 1563. Vites vulgo Agnus Castus Caesalp., De Pl. Lib. 3, cap. 51: 128. 1583. Agno Casto Durante, Herb. Nuov., ed. Roma, 11. 1585. Vitex Camerarius in Matthioli, De Pl. Epit. 105. 1586. Vitex matthioli Delechamps, Hist. Gen. Pl. 281. 1587. Eleagnum theophrasti Lobel, Icon. 2: 138. 1591. Vitex, sive Agnus Castus Gerarde, Herball 1387. 1597. Piper agreste Gerarde, Herball 1388, in syn. 1597. Vitex siue Agno Casto Dodoens, Stirp. Hist. Pemp. 774. 1616. Viticis ramulus cum flore Dodoens, Stirp. Hist. Pemp. 774, in syn. 1616. Agnus Castus Dodoens, Cruydt-Boeck 1213. 1618. Vitex sive Agnus castus Parkinson, Theatr. Bot. 1437. 1640. Vitex flore purpureo Castelli, Hort. Mess. 24. 1640. Agnus folio non serrato J. Bauhin, Hist. Plant. Univers. 1 (6): 205. 1650. Agnus sive Vitex J. Bauhin, Hist. Plant. Univers. 1 (6): 205. 1650. Vitex foliis angustioribus cannabis modo dispositis K. Bauhin, Pin. 475. 1671. Agnus Castus Cupani, Hort. Cathol. 4. 1696. Vitex; foliis angustioribus, Cannabis modo dispositis Boerhaave, Index Alt. Plant. 2: 222. 1720. Vitex foliis angustioribus Cannabis instar dispositis Zanichelli, Opusc. Bot. Posth. 21. 1730. Agnus Geoffroy, Tract. Mat. Med. 3: 44. 1741. Vitex integra Medic., Beobacht. 313. 1782. Vitex agnus castus angustifolia Ait., Hort. Kew. 2: 365. 1789. Vitex lupinifolia Salisb., Prodr. Stirp. Chap. Allert. 106. 1796. Vitex agnus Stokes, Bot. Mat. Med. 3: 413. 1812. Agnus Alston apud Stokes, Bot. Mat. Med. 3: 413, in syn. 1812. Vitex agnus  $\alpha$  integerrima Stokes, Bot. Mat. Med. 3: 413. 1812. Vitex robusta Lebas, Rev. Hort. 30. 1869. Agnus castus vulgaris Carr., Rev. Hort. 1870: 415. 1871. Vitex agnus castus var. agnus castus Kurz, For. Fl. Brit. Burma 270. 1877. Agnus-castus vulgaris Carr. apud Rehd., Man. Cult. Trees 777, in syn. 1927. Vitex angus-castus L. apud Pfei, Verbenac. China 92, sphalm. 1932. Agnus castus Blackw. ex Moldenke, Prelim. Alph. List Invalid Names 4, in syn. 1940. Piper agrestis Gerarde ex Moldenke, op. cit. 36, in syn. 1940.



Vitex agnus L. ex Moldenke, op. cit. 49, in syn. 1940. Vitex agnuscastus L. apud Ducke, Inst. Agron. Norte Bol. Técn. 8: 14, sphalm. 1946. Vitex igneus-castus Commons ex Moldenke, Alph. List Invalid Names Suppl. 1: 28, in syn. 1947. Vitex agnus-castus var. mediterranea Kuntze, in herb. Vitex agnus var. humilis Moll, in herb. Vitex agnus L., in herb. Vitex castus L., in herb. Vitex agnus-casti L., in herb.

Shrub or low tree, to 6.5 m. tall; branches medium, obtusely tetragonal, grayish, medullose, densely short-puberulent or pulverulent; branchlets rather slender, obtusely tetragonal or subterete, brownish or buff in color, often slightly striate, densely short-puberulent or pulverulent and marked with resinous globules; pith rather stout; nodes often slightly annulate; principal internodes 3--7.5 cm. long; leaves decussate-opposite, 5--9-foliolate (rarely 3-foliolate or even 1-foliolate), fragrant; petioles slender, 1.5--7.5 cm. long, densely puberulent and resinous-granular, not noticeably ampliate at the base, somewhat flattened above; leaflets mostly quite unequal in size, the central one largest, the lowermost pair smallest, the 3 largest petiolulate with petiolules more or less margined and 2--10 mm. long (rarely subsessile), the 2 or 4 smallest sessile, subsessile, or occasionally also shortly petiolulate; leaflet-blades thin-chartaceous or submembranous, gray-brown (or nigrescent in drying) above, whitish beneath, very fragile, narrowly elliptic, the central one 4.5--11.5 cm. long and 9--21 mm. wide, attenuate or acuminate at both ends, more or less pulverulent or glabrate above, densely short-puberulent or tomentellous with appressed incanous or cinereous tomentum beneath, entire or more or less undulate-subrepand (and occasionally subrevolute in drying) along the margins (very rarely with 1 or 2 obtuse teeth), the lateral ones similar to the central one in all respects except size and often more acute at both ends or even blunt at the apex; midrib flat and slightly more densely pulverulent above, prominulous beneath; secondaries numerous, 8--15 per side, short, arcuate-ascending, not plainly anastomosing, usually practically indiscernible above, very slightly prominulous or inconspicuous beneath; vein and veinlet reticulation usually indiscernible on both surfaces; inflorescence paniculate, terminal and axillary or supra-axillary at the uppermost nodes, forming a pyramidal inflorescence; panicles 4--31 cm. long, 1.5--2 (rarely to 3.3) cm. wide at anthesis, 1--1.5 cm. wide in fruit, composed of numerous paired many-flowered sessile or subsessile cymules; peduncles (1.5--3 cm. long) and rachis slender, obtusely tetragonal or subterete, densely short-pubescent or pulverulent and resinous-granular like the branchlets, mostly incanous; sympodia usually abbreviated or to 3.5 cm. long; pedicels very slender, 1 mm. long or less, incanous-puberulent; bracts usually none (or occasionally 1 or 2 subtending the lowest cymes and then simple and entire or 1--3-lobed or else 5--7-foliolate like the leaves but smaller); bractlets and prophylla linear-setaceous, about 1 mm. long, incanous, occasionally to 4 mm. long; flowers odorous; calyx broad-

ly campanulate, 2--2.5 mm. long, densely white-puberulous on the outside, its rim shortly 5-toothed; corolla lavender, flesh-pink, lilac, violet-blue, or bluish-purple, its tube broadly cylindric, 6--7 mm. long, 2--2.5 mm. wide, densely white-puberulent above the calyx, its limb 5--13 mm. wide, the lobes obtuse or acutish; stamens and style exerted; fruiting-calyx cupuliform, about 2 mm. long and 3 mm. wide, densely incanous-puberulent on the outside, its rim regularly 5-toothed with small subapiculate teeth; fruit drupaceous, subglobose, about 3 mm. in diameter, glabrate.

This is the type (i.e., lectotype) species of the genus and the one most widely known in cultivation. It has been known and described since the time of Homer (ca. 950--850 B.C.) and Theophrastus (371--287 B.C.). It is native abundantly throughout the Mediterranean region and the Orient from Spain and southern France, the Balearic Islands, Greece, Italy, Cyprus, Sicily, Corsica, Sardinia, Crete, Malta, Turkestan, Transcaucasia, Turkey, Syria, Iraq, Lebanon, and Palestine, northward to southern Germany and Hungary, east to Pakistan, and south to Morocco. It has also been reported from Iran, Egypt, Afghanistan, and Baluchistan and probably occurs there, although I have seen no material from those places except a cultivated specimen from Egypt. Eig, Zohary, & Feinbrun in their "Plants of Palestine", page 305 (1931) say that it grows there in moist habitats of lowlands in the Sharon and Mount Carmel districts, blooming from February to September, and called the "common bush of Abraham". Post and Dinsmore report it as "common" in the area on which they worked. Nebelek reports the species from Moab, while Aaron Aaronson found it in Galilee (his no. 7138).

It has escaped from cultivation and become naturalized in Portuguese East Africa, Natal, Formosa, Java, the southern United States, Hispaniola, Puerto Rico, Saint Thomas, Saint Croix, Saint Kitts, Antigua, Guadeloupe, Grenada, British Guiana, and Surinam, and is abundantly cultivated as an ornamental in many parts of Europe, Asia, Africa, and America. In addition to the records cited below and substantiated by actual herbarium specimens, Wisler in his "Swarthmore Plant Notes" 1: 217 (1942--43) says it is cultivated in Delaware County, Pennsylvania. It is said to be cultivated "in native gardens" in Southern Nigeria. I have personally seen it in cultivated at Great Neck, Nassau County, New York on November 20, 1938. Gates in his "Flora of Kansas", page 191 (1940) says that it occurs only in cultivation in Kansas. Box in his "Flora of Antigua" (mss.) records it as "a garden plant" on the basis of "Herb. Hooker s.n. in Vienna Mus." I have examined this specimen and find that its label does not indicate that the specimen came from a cultivated plant. It is mentioned in Darwiniana 3: 55 (1937) at cultivated at Buenos Aires. L. H. Bailey's catalogue of florists in 1935 listed 21 that handled or offered this species.

Lam in Verberac. Malay. Arch. 180 (1919) credits the binomial to page "890" of Linnaeus' "Species Plantarum". Several other authors have said the same thing, but the name does not occur on that page! Schauer in A. DC., *Prodr.* 11: 684 (1847) gives the

erroneous citation. Lam says that the species was "imported into W. India and into Java (Batavia: Backer, Koorders)". All the Javan material, however, including the Backer and Koorders collections, in the Buitenzorg herbarium -- as well as the "W. India" [=Pakistan] material in that herbarium -- have proved to be V. negundo.

In Palestine and neighboring lands an ecologic formation, according to Eig in *Palest. Journ. Bot. Jerus.* 3: 231 (1946), is named for Vitex agnus-castus. It is called *Viticetum Agni-casti* and consists of 2.3 percent of this species and includes also Inula viscosa, Tolpis virgata, Ononis leiosperma, and Poterium spinosum.

In its native haunts V. agnus-castus is found on hillsides, in sandy fields and wet sandy places, along dry roadsides, in swamps, on river banks and river bottoms, in pine woods and thickets, and along the sides of rivulets. Bertrand found it in littoral areas in France and Sennen collected it on talus in Spain. In America it has taken to hammocks, upland woods, and waste ground, especially in sandy loam, loam-clay, or blackland-clay soils.

Some botanists have questioned whether this plant actually grows without cultivation in the New World, but there is abundant testimony that it does. Earle, for instance, in *Bull. Ala. Agr. Exp. Sta.* 119: 101 (1902) says "freely escaped, roadsides, etc." Harper also says it "occasionally escapes to roadsides" in Alabama. Cory says it is "escaped and established in canyons" in Real County, Texas. Rhoades found it "in a swamp" at Port Vincent, Louisiana. The label on Schallert 1248 states "escaped" in Forsyth County, North Carolina. Barkley found it growing "at edge of Waller Creek" in Travis County, Texas. Buswell's specimen from Polk County, Florida, according to a letter to me from him, is from "escaped" material. Cuthbert says it is "a rather frequent escape" in Richmond County, Georgia. Letterman found it "escaped" at Texarkana in October, 1894. Earle and Baker found it "escaped" at Auburn, Alabama, on October 9, 1898. C. S. Williamson found it in "waste ground" at Savannah, Georgia, in July, 1895. The C. B. Williams 57 is from "waste places" at Goliad, Texas, while Curtis 6813 is in part from "dry roadsides (and river bottom) near Bainbridge, Ga." and in part from "bank of river at Milton, Fla." Eggers 795 has a label reading "ad habitationes naturales, Aug. 1882" on Saint Thomas island. Small found it "in the Ocmulgee River swamp, below Macon, Ga.", July 8--9, 1895, while Maxon found it "in sandy soil along Penn. R.R., Lanham, Md., July 24, 1904".

L. H. & E. Z. Bailey 15233 represents "a straggling bush-like tree in pine woods, 10--12 ft. high...Uleta, Fla., April 14, 1931". The label on E. J. Palmer 29537 says "Thickets along small creek, near Brownwood, Texas (escaped from cult.), Nov. 2, 1925" while the same collector's number 7584 is from "upland woods (adventive), Pineville, La., May 11, 1915". Small found it "along the Altamaha River, about Fort Barrington, Ga., June 26, 1395".

Mohr states, on the label of his collection, "Frequently cult. by the older settlers, sparsely escaped, Pascacoula, Ala., June 23, 1890". The label on Wolff 1002 reads "Shrub 12 feet tall, Cowhouse Creek, 8 miles NW of Belton, Tex., July 8, 1929". Ruth 1362 has a label reading "In sandy soil, Tarrant Co., Texas, July 5, 1924". Dr. G. Clyde Fisher's specimen was collected "near Fort Valley, Ga., June 27, 1912", while Miss M. B. Flint says "Introduced, Brookhaven, Miss., June 1, 1882" and Hexamer & Maier say "Introduced, Abbeville distr., S. C., July 1855". Langlois says "Cultivated and found here and there near dwellings, St. Martinville, La., June 1879". Small 7991 is inscribed "Hammocks, Flamingo, Cape Sable region, Fla., Nov. 26, 1916". The Peters collection in the Gray Herbarium is inscribed "Adventive? or cult., Moulton, Ala." and the W. J. Robbins specimen in the same herbarium is labeled "Cultivated?, Macon, Missouri, 15 Oct. 1920". Earle & Baker record it as "escaped" in Lee County, Alabama.

On the other hand, the two Herb. Lugd.-Bat. specimens cited below as cultivated have labels that do not actually indicate this fact. The Clothier collection from Manhattan, Kansas, is cited by me as from cultivated material only because Gates states that all Kansas material is cultivated. The B. B. Higgins specimen from Griffin, Georgia, is from cultivated material according to a letter from him in my file dated September 13, 1945, although its label does not indicate this fact.

Vitex agnus-castus Grows from the littoral at sea level to an altitude of at least 150 meters in its native haunts, and often begins to bloom when it is only 4 feet tall. It has been collected in anthesis in practically every month of the year, and in fruit in February and from June to October. The leaves are sometimes infested with insect galls (e.g., Herb. Hort. Bot. Pisa s. n. in the Columbia University Herbarium) and, according to Westcott's "Plant Disease Handbook", page 660 (1950), by a "leafspot" caused by the fungus Cercospora viticis Ellis & Ev. and a "root-rot" caused by Phymatotrichum omnivorum (Shear) Duggar.

Monteiro da Costa reports that the species is used for perfume in Brazil. The aromatic leaves are used to spice dishes in Nigeria and British Guiana. Mathews reports that the leaves are employed medicinally in Peru. In Florida it is claimed that the plant repels mosquitoes. The seeds are said to possess a sedative effect. F. C. Hoehne in his "Plantas e Substâncias Tóxicas e Medicinais", page 250 (1939), discusses its medicinal uses. G. L. Fisher reports that it has a "pepper taste". Laszlo & Henshaw in Science 119: 630 (1954) state that it increases sterility in women with increasing doses and retards estrus in female rats. Lindley in Med. & Oeconom. Bot. 223 (1849) says it has acrid fruit and that the seeds are used in Smyrna as an external application against colic, while taken internally they act as a powerful aphrodisiac. J. L. Dalziel reports that the fragrant leaves are used in Southern Nigeria. Dawodu says that the "scented leaves.....are used to spice dishes" at Lagos. It is also used as a spice in British Guiana. Black says of it "arbusto cultivado em

chacara, flor roxa lilaz; com aspecto de uma Buddleja; folhagem com cheiro aromático de Salvia apiana, docção usada para banho contra dor de cabeça."

Culture notes are given by P. J. van Melle in his "Shrubs and Trees for the Small Place", pages 54--55 (1943), by Aul in the "New York Herald Tribune" for May 8, 1949, sect. 5, page 11, and by A. C. Hottes in his "Book of Shrubs", pages 403--405 (1942). They indicate that the species is hardy in the northern United States, but dies back in some winters north of New York City. Even if the top does overwinter, it is advisable to prune it back severely -- even to within 6 inches of the ground -- early each spring in order to obtain more profuse blooming. It requires a deep, moist, well-drained soil or light sandy soil, in full sunlight, preferably a bit acid (with a minimum acid of pH 4.0--5.0). It is coarse-rooted and therefore difficult to transplant with a ball of earth. For this reason it is best to transplant it bare-rooted in spring. It seeds freely, and the seeds may be sown in spring. Both hardwood cuttings and summer softwood cuttings must be protected from frost and overwintered in a greenhouse. The tree may also be propagated by layering and by suckers. Because of its pulverulent or puberulent foliage and branches it gives a grayish effect and is not easily blended in a plant border. It may be planted with Caryopteris, Hypericum, and Buddleja, but is most useful as an accent plant or in a cut-back garden hedgerow. It makes a yearly growth of 3 to 5 feet and flowers from July to September -- a time when not many other garden shrubs are in bloom -- and so constitutes a worthwhile addition for contributing a decorative note to small garden landscapes. Shinnars says that it grows in partial shade and describes it as a dense shrub 2 meters tall with ascending to erect branches and aromatic foliage. H. N. Webster in his "Herbs, How to Grow and How to Use Them", page 42 (1942) says that it is suitable for Shakespeare gardens.

Germination studies on this plant are described by C. M. King in Iowa Acad. Sci. Proc. 39: 66, 73, & 74 (1932), the endosperm morphology by A. C. Martin in Am. Midl. Nat. 36: 603--609 (1946), and the gynoeceum morphology by Junell in Symb. Bot. Upsal. 4: 93 (1934). Darlington & Janaki Ammal, in their "Chromosome Atlas", page 271 (1945), say that the chromosome number is 24. This is based on Paternmann's work in 1933.

The type of the species is sheet number 4 under genus 811 (790) in the Linnean Herbarium at London, collected in Clifford's garden and inscribed "Agnus" in Linnaeus' own handwriting.

The Vitex verticillata Lam., Vitex latifolia Mill., Vitex agnus-castus var. latifolia Mill., Vitex agnus-castus var. latifolia Loud., Vitex agnus-castus latifolia Tornabene, Vitex agnus-castus var. latifolia Tornabene, and Vitex agnus-castus var. fossilis Moldenke, often included in the synonymy of this species in its typical form, actually are all V. agnus-castus f. latifolia (Mill.) Rehd., a quite common and distinct natural form; the Vitex sinuata Medic. is actually V. negundo var. heter-

ophylla (Franch.) Rehd.; the Vitex agnus-castus Kurz is V. trifolia L.; the Agnus Castus flore albo Cup. and Vitex flore albo Cast. are V. agnus-castus f. alba (West.) Rehd.; the "Vitex haussknechtii Bormm." is a valid species, V. hausknechtii Bormm.; and the Agnus-castus var. caerulea Hort., Vitex agnus-castus var. caerulea Hort., Vitex agnus-castus var. caerulea L., and Vitex floribus caeruleis Zannich. are actually V. agnus-castus var. caerulea Rehd. The Vitex pseudo-negundo Hand.-Mazz. and V. agnus-castus var. pseudo-negundo (Hausskn.) Bormm., previously regarded by me as being conspecific with the species here being discussed, are now regarded by me as representing a distinct geographic variety, V. agnus-castus var. pseudo-negundo (Hausskn.) Bormm. Besides the confusion entailed by these many cases of unjustified reduction to synonymy, herbarium specimens of V. agnus-castus have been mis-identified in herbaria as V. negundo L., V. leucoxydon L. f., V. trifolia L., and V. negundo var. incisa (Lam.) C. B. Clarke. The Popenoe 613, J. Stefani s.n. [10 Mai 1903], and Perrier s.n. [Montpellier, 1890], all originally distributed as Vitex agnus-castus by the collectors, are actually Ehretia thyrsoflora (Sieb. & Zucc.) Nakai of the Ehretiaceae, Teucrium fruticans L. of the Lamiaceae, and Salix alba L. of the Salicaceae, respectively.

Shimek identified his collections, cited below, as "Vitex agnus-castus Kurz", but this homonymous binomial is actually a synonym of V. trifolia L. The Raizada specimen cited below was first identified as V. trifolia and then re-determined, also erroneously, by E. D. Merrill as V. negundo L.

Common names for this plant are very numerous and include "Abraham's balm", "Abraham's balm fruit", "Abrahamsbaum", "Abrahamsboom", "Abrahamstrauch", "agneau chaste", "agnocasto", "agno-casto commune", "agnus castus", "agnus-castus", "alecrim d'Angola", "aloch", "arbre au poivre", "arbre de poivre", "artenhewe", "ayid aḡ", "bes parmak aḡ", "boom der kuisheid", "borst-saame", "borst-samen", "chaste lamb", "chaste lamb tree", "chaste tree", "chaste-tree", "common bush of Abraham", "common chaste-tree", "europische kuisboom", "faux poivre", "faux poivrier", "gattilier", "gattilier", "gattilier commun", "grattilier", "hemp tree", "hemp-tree", "herbe chaste", "incenso japonés", "Indian-spice", "kaff maryam", "Keuschbaum", "Keuschbaum müllen", "Keuschbaumüllon", "Keuschbaumsamen", "Keuschlamm", "Keuschlammstrauch", "keuschlamp", "Klosterpfeffer", "kuischboom", "kuisch-lam", "Kuischbaum", "krysche boom", "lavender", "Lönchspfeffer", "monchspfeffer", "monks pepper-bush", "monks pepper-tree", "monk's pepper tree", "monnikspeper", "mullen", "Müllen", "myrrh tree", "old English lavender", "pau de Angola", "pébré", "pébrier", "pepe di monaci", "pepe falso", "peperboom", "peperella", "pepper taste", "petit poivre", "Pfefferbaum", "pimenta de Guinea", "poivre commun", "poivre de moine", "poivre des moines", "poivre petit", "poivre saurage", "poivre sauvage",

"sage bush", "sage tree", "sanzgatilillo", "Schaafmühle", "Schaafsmühle", "schaapsmiul", "Schaf-milch", "schaf-milte", "Schaf-mühle", "Schaf-mülle", "Schaf-müllen", "scahfs-milben", "schafs-millen", "Schafs-mühlen", "Schafs-mülben", "schafs-mullel", "Schafs-müllen", "schafwulle", "shag ibrâhm", "totsane", "tree of chastity", "true chaste-tree", "Virginia sage", "vitice", "wild lavender", "wild-pepper", "yemen safrani", "zeewilg", and the Greek *Λυγός* (of Homer), *ἀγνός* (of Dioscorides), *ἴσος*, *οἴσος*, and *λυγός* (of Theophrastus), and *λιγαρία* (of neo-Greek authors). Of these names "alecrim d'Angola" is used mostly in Brazil, "Indian-spice" in British Guiana, "chaste-tree", "hemp-tree", and "monk's pepper-tree" in California, "wild lavender" and "wild-pepper" in Florida, "true chaste-tree" in Missouri, "Pimienta de Guinea" in the Dominican Republic, "europische kuischboom" in Holland, "ayid ağ", "bes parmak ağ", and "yemen safrani" in Turkey, "agno casto commune", "pepe falso", "peperella", and "vitice" in Italy, "agneau chaste", "gattilier", "arbre au poivre", and "petit poivre" in France, and "Abrahamsbaum" and "Keuschbaum Mullen" in Germany.

Ducke in Inst. Agron. Norte Bol. Técn. 8: 15 (1946) says the name "pau de Angola", indicating an African origin for the plant, is applied to this species in Brazil in error because its fragrance resembles that of a perfume popular in Portugal which bears that name. Harper in Econom. Bot. Ala. 2: 312 (1928) says the plant is commonly called "lavender" in Alabama because it resembles *Lavandula* in the color of its flowers and the odor of the foliage. He cites a Manningham specimen from Butler County, Alabama, not yet seen by me.

Kuntze in Rev. Gen. Pl. 2: 510--511 (1891) has a very broad concept of this species, including in it several taxa now almost uniformly regarded as specifically distinct. He divides his *Vitex agnus-castus* into the following "varieties":

Leaflets 5--7, the middle one subsessile or petiolulate. α *typica*.  
Leaflets 3--7.

Leaflets all sessile, 1: 1 1/2--4..... β *trifolia*.  
Middle 1 to 3 leaflets petiolulate.

Leaflets 1: 2 1/2--4..... γ *negundo*.

Leaflets 1: 5--8..... δ *negundodes*.

Leaflets 1: 1--2..... ε *javanica*.

Leaflets 1--3.

Leaflets mostly 3, 1: 2..... ζ *subtrisecta*.

Leaflets mostly or all 1, 1: 1--1 1/2..... η *ovata*.

It would appear that var. *typica* Kuntze only is true *V. agnus-castus*; var. *trifolia* (L.) Kurz is typical *V. trifolia* L.; var. *negundo* (L.) Kuntze is typical *V. negundo* L.; var. *negundodes* Kuntze is *V. trifolia* var. *bicolor* (Willd.) Moldenke; var. *subtrisecta* Kuntze is *V. trifolia* var. *heterophylla* (Mak.) Moldenke; and var. *ovata* Kuntze is *V. trifolia* var. *simplicifolia* Cham. The identity of var. *javanica* Kuntze is still in doubt. On the label of a specimen in the Britton Herbarium Kuntze proposes still another variety, *V. agnus-castus* var. *mediterranea* Kuntze,

with the added descriptive phrase "foliolis 5--7 medio saepe petiolulatis." I do not believe the specimen is distinguishable from typical V. agnus-castus.

Simple, long-petiolulate, 3-lobed bracts are seen clearly on the Inglis specimen in the Bailey Hortorium herbarium. Both simple and entire bracts and 1--3-lobed bracts may be seen on Mohr s.n. in the United States National Museum (sheet no. 771905). Winter twigs can be seen on Herb. Mo. Bot. Gard. 116064, while Divine 49 from Oklahoma shows some 1-foliolate leaves at the apex of the stems. Monteiro da Costa 159 in the Britton Herbarium exhibits four 3-foliolate leaves while all the rest of the leaves on the specimen are 5-foliolate.

The species may usually be distinguished from V. negundo by having more numerous leaflets and by its sessile or subsessile cymules. Specimens with the leaflets somewhat wider than usual are seen not only among cultivated material, but also among native south European material. Specimens of this broad-leafleted form -- like Stuckert 6813 -- remind one strongly of f. latifolia (Mill.) Rehd., but the character is not constant. Curtiss 6813 shows both the narrow and broad leaflets on the same branchlet, especially on the specimens in the Britton and Gray Herbaria.

Tissue-thin microtome sections of the stems may be seen on the University of Vermont sheet of Vaccari 18. Cuthbert claims that his specimen is from a tree "20 feet tall", and Curtis states that one of his was from a "tree one foot in diameter".

Citations: MARYLAND: Prince Georges Co.: Maxon s.n. [Lanham, July 24, 1904] (W--494711). DISTRICT OF COLUMBIA: Vasey s.n. [Agr. grounds, 1875] (Ka); Ward s.n. [July 29, 1882] (W--147603). NORTH CAROLINA: Forsyth Co.: P. O. Schallert 1248 (Vt). SOUTH CAROLINA: Abbeville Co.: Hexamer & Maier s.n. [introduced, Abbeville distr.] (G). Richland Co.: K. A. Taylor s.n. [Columbia, June '91] (F--408910). GEORGIA: Bibb Co.: J. K. Small s.n. [Ocmulgee River swamp below Macon, July 8--9, 1895] (C, F--180897). Chatham Co.: Williamson s.n. [Savannah, July 1895] (D--509879, N). Decatur Co.: Curtiss 6813, in part [Bainbridge, June 20, 1901] (Ar--7507, Ca--104855, Cb, E--116143, Ed, G, It, K, Ka, N, P, S, Vu, W--394707). McIntosh Co.: J. K. Small s.n. [about Fort Barrington, June 26, 1895] (C, F--180651). Peach Co.: G. C. Fisher s.n. [Fort Valley, June 27, 1912] (N). FLORIDA: Hernando Co.: A. S. Hitchcock s.n. [June-July 1898] (F--234729). Hillsborough Co.: Bailey & Bailey 15233 (Ba, N). Leon Co.: Nash s.n. [Aug. 1895] (It). Monroe Co.: Layne 10 (E--116065); J. K. Small 7991 (N). Polk Co.: Buswell s.n. [April 1919] (Bu). Santa Rosa Co.: Curtiss 6813, in part [Milton, Aug. 3, 1901] (Ar--7507, Ca--104855, Cb, E--116143, Ed, G, It, K, Ka, N, P, S, Vu, W--394707). ALABAMA: Lawrence Co.: Peters s.n. [adventive? or cult., Moulton] (G). Lee Co.: Earle & Baker s.n. [Auburn, 7-8-1897] (Al, E--116146, Ka, N, Ob--50879, Po--63436, Ur), s.n. [Auburn, 10-9-1898] (E--116136, N, Ur). MISSISSIPPI: Adams Co.: Shimek s.n. [Natchez,



June 1898] (E--116144, F--78617). Hancock Co.: A. Allison s.n. [Day St. Louis] (A, Ca--139767, N, W--444740). Lincoln Co.: Flint s.n. [Brookhaven, June 1, 1882] (W--1323348). ARKANSAS: Miller Co.: Letterman s.n. [Texarkana, Oct. 1895] (E--116141). LOUISIANA: Livingston Par.: W. H. Rhoades s.n. [Port Vincent, July 1931; H. N. Moldenke 17077] (Bt, Bt--61225, Hs, Hs, N, Ob--83995, St, Up). Natchitoches Par.: E. J. Palmer 7584, in part (E--793742, K). Rapides Par.: E. J. Palmer 7584, in part (A, Gg--31478, Po--220831). Saint Bernard Par.: Joor s.n. [July 29, 1887] (Tl). OKLAHOMA: Jackson Co.: Pigg s.n. [Martha, Oct. 20, 1937] (St--14234). Pawnee Co.: Dillingham s.n. [June 29, 1935] (St--9282). Payne Co.: Ambrose 119 (St--9285); Askew 45 (St--22036); Divine 49 (Au); Pullin 258 (St--9283); Rees 313 (Or--40100). TEXAS: Bell Co.: Wolff 1002 (W--1622570). Bexar Co.: Clemens & Clemens 961 (E--808576, N, Po--69588); G. Jermy s.n. [1904] (N). Bowie Co.: Letterman s.n. [Texarkana] (D--563467, E--769467, N). Brazos Co.: H. B. Parks s.n. [College Station, 1919] (Tr). Brown Co.: E. J. Palmer 29537 (A). Dallas Co.: Lundell & Lundell 9352 (N). Erath Co.: Laugh s.n. [5-18-21] (Au). Goliad Co.: C. B. Williams 57 (D--628993). Harris Co.: G. L. Fisher s.n. [escaped from cultivation, Houston, July 21, 1917] (Wi). Maverick Co.: C. C. Albers 33005 (Au). Real Co.: Cory 34773 (N, N). San Augustine Co.: Crocket s.n. [San Augustine] (W--500096). Tarrant Co.: Ruth 993 (It, Ka--67791, St--21443), 1362 (N, Nt). Travis Co.: F. A. Barkley 13081 (Al); Barkley & Copeland 71 (Au, N); A. Gabriel 3802 (J); Harpin, Waldorf, & Barkley 13081 (Au, N); Herb. Univ. Texas s.n. [Austin, 8/14/19] (Au); McKee & Wesley 3397 (Au, Au); E. D. Schulz s.n. [Austin, August 1921] (Wi, Wi). County undetermined: Tharp s.n. (Io--104904). NEW MEXICO: Dona Ana Co.: P. C. Standley s.n. [College Farm, June 19, 1906] (W--560862). HISPANIOLA: Dominican Republic: Chardon 757, host (It); Eggers 2845 (B); Howard & Howard 9942 (N). Haiti: Poiteau s.n. [St. Dom.] (Cb, Cb, Cb, D, E--116131). PUERTO RICO: Otero 211 (N). SAINT THOMAS: Eggers 795 (B, B, B, Br, Cb, Gg--34475, Le, Lu--3397, P, V, Vu), s.n. [Sept. 1882] (W--1323347); Krebs s.n. [9/8/1844] (Bz--23795). SAINT CROIX: Herb. Hort. Bot. Haun. s.n. (Bz--23796); Herb. Mus. Bot. Lund. s.n. [St. Crux] (Lu); Herb. Univ. Christian. s.n. (Ol). SAINT KITTS: Forsström s.n. (S). ANTIGUA: Herb. Hooker f. s.n. (V). GUADELOUPE: Eertero s.n. (Dc). GRENADA: G. W. Smith 68 (B). WEST INDIES: Island undetermined: Benzon s.n. [1820] (Cp); Collector undesignated s.n. (Us); Herb. Liebmann s.n. (Cp); Herb. Lund. s.n. (Cp). BRITISH GUIANA: Dahlgren & Persaud "bis" (F--519318), s.n. [April 22, 1922] (F--519317). SURINAM: Collector undesignated 1209 (Ut), s.n. (D); Voltz s.n. (Ut, Ut); Wullschlägel 1089 (Gt). BRAZIL: Pará: Monteiro da Costa 159 (F--685474,

N). Rio de Janeiro: Rudio s.n. (B). FRANCE: C. Alstroemer s.n. [Provence] (S); Arbost s.n. [8 octobre 1905] (Br); Autheman 5467 (Du); C. Bertrand 363 (La); F. C. Bertrand s.n. [St. Aygulf] (La, Ma--24572); Cavin s.n. [Cap Martin près Lenton, Sept. 1890] (Ur), s.n. [Cap Martin] (N); Guillon s.n. [Portozudret, 26 aout 1870] (Br); Hérail s.n. [Béziers, 27 juillet 1880] (Du); Herb. Boutigny s.n. [Aout 1849] (Du); Herb. Mus. Bot. Stockholm s.n. [Cap Martin] (S); Herb. Perrier s.n. [Narbonne] (Ur); Jaques s.n. [Cagne, 28 juillet 1905] (Go); Jaquet s.n. [Antibes] (S); R. Koehler s.n. [Septembre 1902] (Go); Montayne s.n. [6 juin 1833] (Du--166541), s.n. [juillet 1838] (Du--166542); Penchinat s.n. [Baenitz 836] (S); E. Perrier s.n. [Béziers, June 1862] (Na); Perris s.n. [Narbonne, 1849] (Du--166544); N. Roux s.n. [8 October 1908] (Br); J. Schmidt s.n. [Juli 31.90] (La); F. Schultz 1207 (Du); Théveneau s.n. [29 juill. 1367] (La); Vahl s.n. (S). PORTUGAL: A. Moller 1547 (Br). SPAIN: Bourgeau 2788 (N); Luglio s.n. [1858] (Du); Sennen 429 (Du, La, S), 914 [VI-VII, fls.] (Ba), 914 [6-IX, fr.] (Ba), s.n. [18/8/1906] (Go), s.n. [1919/5/IX] (Br); Veyreda s.n. [Gerona, 20 aout 1876] (Go). BALEARIC ISLANDS: Majorca: Bianor Marie s.n. [1919.18 sepembre] (Br); Bourgeau 2788 (Du); Knoche 139-2619 (Du, Du, Du, Du), 201a-2019 (Du), XB.236 (Du). Minorca: J. J. Rodriguez s.n. (Du). GERMANY: Fischer 122 (Io--35293). GREECE: Baldacci s.n. [Epirus, Julio 1939] (Br); Cyrén s.n. [Agrinion, 15.6.1934] (S), s.n. [Agrinion, 15.6.1935] (S); Engelhardt s.n. [3.3.1904] (La); Frivaldsky s.n. [Macedonia] (M); Haptróm s.n. [6/5/1931] (S); Heldreich 599 (S); Hübel 1880 (La); M. Martens s.n. (Br); Mattfeld 2035 (Au, Du--172311, S), 2644 (Au, Du--172312, S), s.n. (Ca--396944); Pinatzi 243 (I); Sintenis & Bornmüller 1437 (Br, Du, S); M. F. Spencer s.n. [Graecia] (Ob--6732); Zvorykin 646 (Gg--203670). IONIAN ISLANDS: Cephalonia: Schimper & Wiest s.n. [16 Oct. 1834] (S). AEGEAN ISLANDS: Rhodes: Hedenborg s.n. [1853] (S). ITALY: C. Dicknell s.n. [Liguria, 16. IX.1890] (S), s.n. [Liguria, 11 Julio 1892] (Br, Br, C, N), s.n. [V.1902] (S), s.n. [Bordighera, 8.X.1910] (Oa); Carnel s.n. [Etrusca] (C); Cosson s.n. [Calabria, 16 juill. 1846] (Er); Gavioli s.n. [8.VIII.1938] (N); Gobelli s.n. [10 Agosto 1833] (Ur); Gresino s.n. [28.VIII.1938] (N, N, N); Hayek s.n. [Isturia, 9 Juli 1900] (Go), s.n. [7 September 1913] (Go); Herb. Coll. Pharmacy s.n. (Pa); Herb. Harvey s.n. [Trieste] (Du--166540); Herb. Hort. Bot. Pisa s.n. [1836] (Du, S), s.n. [1856] (Go), s.n. (C); Herb. Martius s.n. [Triest, 24 M. 56] (Er); Herb. R. Mus. Florent. s.n. (Pa); Herb. Tap s.n. [Liguria, August 1906] (La); Mori s.n. [Agosto 1933] (Ew); Reiner s.n. [Tergesti] (Br); Savi 1995 (Er), s.n. [Agosto 1841] (Br); C. Skottsberg s.n. [21/7/1934] (Go); Stein s.n. [Tyrol] (Br); Todaro s.n. (Br, S); Tommasini s.n.

[Illirica] (Br), s.n. [Monfalcone, Illyria] (Ms); Van Heurck s.n. [près Naples, 1868] (Br); E. Wall 49 [15/524] (Ew); Waterer s.n. [9.VIII.1921] (Go); Watson s.n. [Trieste, 9-VIII-1921] (S). CYP-RUS: H. Lindberg s.n. [22.7.1838] (S); Sintenis 683 (S); Sintenis & Rigo 683 (Du). SICILY: Babington s.n. [July 1847] (C); Herb. Mus. Bot. Stockholm s.n. [Messina] (S); Kuntze s.n. [Taormina] (N); Prestandrea s.n. [Messina, 1849] (S); H. Ross 365 (Go, S), s.n. [Catania, VIII.13] (S); M. F. Spencer s.n. [11.15.1895] (Ob-6731); Todaro 400 (Du, La, S). CORSICA: Aellen 1856 (Go, I, I, N); Caldesi s.n. [28 Agosto 1850] (S); O. Debeaux s.n. [31 juillet 1870] (S); Evers s.n. [Insula Clara] (Go); Gysperger s.n. [7.7.05] (Gg--31476, Go); Herb. d'Udekem s.n. [Corse, 1834] (Br); Herb. Harvey s.n. (Du--166538); Herb. Martius s.n. (Br); Jacquemont s.n. [Henecart, Corse] (N); E. Reverchon 272 (Br, Du, N); Sellen 1856 (Ms). SARDINIA: Vaccari 18 (Vt), 356 (Vt), s.n. [1895] (Go). CRETE: K. H. Rechinger 13994 (S); E. Reverchon 185 (Br, S); Sieber s.n. [Suda] (Br, S), s.n. (M). MALTA: Delicata s.n. [Malta] (S). JUGOSLAVIA: Dalmatia: H. Noë s.n. (Du); Petter 413 (S), s.n. (Go); Soška s.n. [14.VII.28] (S). Fiume: Lejeune s.n. [Fiume] (Br); F. W. Noë 329 (Br, S); H. Noë s.n. [Huter 329] (Go, Po--64769); Rossi s.n. [8.1873] (Du--9523); Untekj s.n. (S). Herzegovina: Herb. Engelhardt s.n. [31/8/1900] (Vt); Laus s.n. [Mostar, VII.1912] (N); Murbeck s.n. [4/7/1889] (S). Ischia: Levier s.n. [10 Sept. 1875] (Go). Istria: Černjauski s.n. [Erceg-Novci, 22.VII.27] (S); Hruby s.n. [Lovrana, 7.1939] (S); Rossi s.n. (La). Montenegro: L. Gross s.n. (Go); Pejovic s.n. [Rohlena, VII.933] (S). OSSERO ISLAND: H. Noë s.n. [Osseri Isl.] (Pa). UNION OF SOCIALIST SOVIET REPUBLICS: Transcaucasia: Grosshin 49 (Go). Turkmenkaya: Michelson 87 (Gg--253261, S); Sintenis 645 (S). MOROCCO: Cosson s.n. [21 Mai 1877] (Pa). ALGERIA: Dukerley s.n. [Prov. de Constantine] (Br); Piré s.n. [Alger] (Br). MASCAR-ETE ISLANDS: Mauritius: Gröndal s.n. (S). TURKEY: J. Berggren 14 (S); Callier 171 (Du, S, S); Fleischer s.n. [Smyrnae, 1827] (Br, Gg--31474, S); Halacsy 1437 (S); Hedenborg s.n. [Turkiet] (S); Herb. Prager 18678 (Gg); Ledebour 14 (S); Manissadjian 133 (S), 496 (S); Montbret s.n. [Smyrne, Nov. 1844] (Du--166545); Peronin 196 (Du, S); Sintenis 1514 (Br); Tengwall 29 (S), 49 (Ew). ISRAEL: Hafström s.n. [27/4/1932] (Go). LEBANON: Herb. D. Don s.n. [Beyrout] (Br); Herb. Martius s.n. [banks of Naht-el-Beirut] (Br); Herb. Univ. Mass. s.n. [Beirut, July 1834] (Ms); F. A. Post s.n. [Leirut, June 16, '71] (Pa). SYRIA: Hafström s.n. [3/6/1932] (S); F. A. Post 376 (Pa); Samuelsson 2198 (S); Vetters s.n. [Lat-takia, VI-VIII.1907] (V--724). IRAQ: Field & Lazar 818 (Du--243398, Du--270893). PAKISTAN: Sind: Herb. Cooke s.n. [Sukkar, Dec. '91] (Mi). CHINA: Province undetermined: Fortune 25 [Koo-long] (S). FORMOSA: Gressitt s.n. [Kuraru, May 1934] (S).